TRIUMPH

BONNEVILLE

BONNEVILLE T100

AMERICA

SPEEDMASTER

THRUXTON

SCRAMBLER

Motorcycle Service Manual

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INTRODUCTION

This manual is designed primarily for use by trained technicians in a properly equipped workshop. However, it contains enough detail and basic information to make it useful to the owner who desires to perform his own basic maintenance and repair work. The work can only be carried out if the owner has the necessary hand and special service tools to complete the job.

A basic knowledge of mechanics, including the proper use of tools and workshop procedures is necessary in order to carry out maintenance and repair work. satisfactorily. Whenever the owner has insufficient experience or doubts his ability to do the work, all adjustments, maintenance, and repair work must be undertaken by an authorised Triumph Dealer.

In order to perform the work efficiently and to avoid costly mistakes, read the text and thoroughly familiarise yourself with procedures before starting work.

All work should be performed with great care and in a clean working area with adequate lighting.

Always use the correct special service tools or equipment specified. Under no circumstances use makeshift tools or equipment since the use of substitutes may adversely affect safe operation.

Where accurate measurements are required, they can only be made using calibrated, precision instruments.

For the duration of the warranty period, all repairs and scheduled maintenance must be performed by an authorised Triumph Dealer.

To maximise the life of your Motorcycle:

- Accurately follow the maintenance requirements of the periodic maintenance chart in the service manual.
- Do not allow problems to develop. Investigate unusual noises and changes in the riding characteristics of the motorcycle. Rectify all problems as soon as possible (immediately if safety related).
- Use only genuine Triumph parts as listed in the parts catalogue/parts microfiche.
- Follow the procedures in this manual carefully and completely. Do not take short cuts.
- Keep complete records of all maintenance and repairs with dates and any new parts installed.
- Use only approved lubricants, as specified in the owner's handbook, in the maintenance of the motorcycle.

How to use this manual

To assist in the use of this manual, the section title is given at the top.

Each major section starts with a contents page, listing the information contained in the section.

The individual steps comprising repair operations are to be followed in the sequence in which they appear.

Adjustment and repair operations include reference to service tool numbers and the associated illustration depicts the tool.

Where usage is not obvious the tool is shown in use.

Adjustment and repair operations also include reference to wear limits, relevant data, torque figures, specialist information and useful assembly details.

Warning, Caution and Note

Particularly important information is presented in the following form:

WARNING: This warning symbol identifies special instructions or procedures which, if not correctly followed, could result in personal injury, or loss of life.

CAUTION: This caution symbol identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

NOTE:

- **This note symbol indicates points of particular interest for more efficient and convenient operation.**

TAMPERING WITH NOISE CONTROL SYSTEM PROHIBITED

Owners are warned that the law may prohibit:

(a) The removal or rendering inoperative by any person other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; and

(b) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

REFERENCES

References

References to the left-hand or right-hand side given in this manual are made when viewing the motorcycle from the rear.

Operations covered in this manual do not always include reference to testing the motorcycle after repair. It is essential that work is inspected and tested after completion and if necessary a road test of the motorcycle is carried out particularly where safety related items are concerned.

Dimensions

The dimensions quoted are to design engineering specification with service limits where applicable.

During the period of running-in from new, certain adjustments may vary from the specification figures given in this manual. These will be reset by the dealer at the 500 mile/800 km service, and thereafter should be maintained at the figures specified in this manual.

REPAIRS AND REPLACEMENTS

Before removal and disassembly, thoroughly clean the motorcycle. Any dirt entering the engine or other parts will work as an abrasive and shorten the life of the motorcycle. Particular attention should be paid when installing a new part, that any dust or metal filings are cleared from the immediate area.

Force

Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Never lever a component as this will cause damage both to the component itself and to the surface being levered against.

Whenever tapping to aid removal of an item is necessary, tap lightly using a hide or plastic faced mallet.

Edges

Watch for sharp edges, especially during engine disassembly and assembly. Protect the hands with industrial quality gloves when lifting the engine or turning it over.

When replacement parts are required, it is essential that only genuine Triumph parts are used.

Safety features and corrosion prevention treatments embodied in the motorcycle may be impaired if other than genuine Triumph parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the manufacturer's specification.

Tightening procedure

Generally, when installing a part with several bolts, nuts or screws, they should all be started in their holes and tightened to a snug fit, evenly and in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely, bolts, nuts, or screws, should all be loosened (in sequence if specified) by about a quarter of a turn and then removed.

Where there is a tightening sequence specified in this Service Manual, the bolts, nuts, or screws must be tightened in the order and by the method indicated.

Torque wrench setting figures given in this Manual must be observed. The torque tools used must be of accurate calibration.

Locking devices, where specified, must be fitted. If the efficiency of a locking device is impaired during removal it must be renewed. This applies particularly to micro-encapsulated fixings which must always be replaced if disturbed. Where necessary, the text in this manual will indicate where such a fixing is used.

GENERAL INFORMATION

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IGNITION SYSTEM SAFETY PRECAUTIONS

WARNING: The ignition system produces extremely high voltages. Do not touch any part of the ignition system or any cables while the engine is running.

An electric shock caused by contact with the ignition system may lead to illness, injury or death.

WARNING: Wearers of surgically implanted heart pacemaker devices should not be in close proximity to ignition circuits and or diagnostic equipment.

The ignition system and any diagnostic equipment may interrupt the normal operation of such devices causing illness or death.

DANGEROUS SUBSTANCES

WARNING: Many liquids and other substances used in motor vehicles are poisonous and should under no circumstances be consumed and should, as far as possible, be kept from contact with the skin. These substances among others include acid, anti-freeze, asbestos, brake fluid, fuel, lubricants, and various adhesives. Always pay close attention to the instructions printed on labels and obey the instructions contained within. These instructions are included for your safety and well being.
NEVER DISREGARD THESE INSTRUCTIONS!

Fluoroelastomers

WARNING: fluoroelastomer material is used in the manufacture of various seals in Triumph motorcycles.

In fire conditions involving temperatures greater than 315°C this material will decompose and can then be potentially hazardous. Highly toxic and corrosive decomposition products, including hydrogen fluoride, carbonyl fluoride, fluorinated olefins and carbon monoxide can be generated and will be present in fumes from fires.

In the presence of any water or humidity hydrogen fluoride may dissolve to form extremely corrosive liquid hydrofluoric acid.
If such conditions exist, do not touch the material and avoid all skin contact. Skin contact with liquid or decomposition residues can cause painful and penetrating burns leading to permanent, irreversible skin and tissue damage.

ENGINE OILS

WARNING: The oil may be hot to the touch. Contact with hot oil may cause the skin to be scalded or burned.

WARNING: Prolonged or repeated contact with engine oil can lead to skin dryness, irritation and dermatitis. In addition used engine oil contains potentially harmful contaminants which can cause cancer. Wear suitable clothing and avoid skin contact.

Health Protection Precautions

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Overalls must be cleaned regularly. Discard heavily soiled clothing and oil impregnated footwear.
- First aid treatment should be obtained immediately for open cuts and wounds. Always be aware of who your nearest first aider is and where the medical facilities are kept.
- Use barrier creams, applying before each work period to protect the skin from the effects of oil and grease and to aid removal of the same after completing work.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use petrol, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, de-grease components prior to handling.

WARNING: Any risk of eye injury must be avoided. Always wear eye protection when using a hammer, air line, cleaning agent or where there is ANY risk of flying debris or chemical splashing

ENVIRONMENTAL PROTECTION PRECAUTIONS

CAUTION: Do not pour oil on the ground, down sewers or drains, or into water courses. To prevent pollution of water courses etc., dispose of used oil sensibly. If in doubt contact your local authority.

Burning of used engine oil in small space heaters or boilers can be recommended only for units of approved design. If in doubt check with the appropriate local authority and/or manufacturer of the approved appliance.

Dispose of used oil and used filters through authorised waste disposal contractors, to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the Local Authority for advice on disposal facilities.

BRAKES

WARNING: Brake fluid is hygroscopic which means it will absorb moisture from the air. Any absorbed moisture will greatly reduce the boiling point of the brake fluid causing a reduction in braking efficiency.

Replace brake fluid in line with the routine maintenance schedule. A dangerous riding condition could result if this important maintenance item is neglected!

Do not spill brake fluid onto any area of the bodywork as this will damage any painted or plastic surface.

Always use new brake fluid from a sealed container and never use fluid from an unsealed container or from one which has been previously opened.

Do not mix different brands of fluid. Check for fluid leakage around brake fittings, seals and joints.

Check regularly for brake hose damage.

FAILURE TO OBSERVE ANY OF THE ABOVE WARNINGS MAY REDUCE BRAKING EFFICIENCY LEADING TO AN ACCIDENT.

WARNING: If there has been an appreciable drop in the level of the fluid in either brake fluid reservoir, consult your authorised Triumph Dealer for advice before riding.

If the brake lever or pedal feels soft when it is applied, or if the lever/pedal travel becomes excessive, there may be air in the brake lines or the brake may be defective.

It is dangerous to operate the motorcycle under such conditions and remedial action must be taken by your authorised Triumph Dealer before riding the motorcycle.

Failure to take remedial action may reduce braking efficiency leading to an accident.

WARNING: Use only DOT. 4 specification brake fluid in the front brake and DOT 3 or 4 fluid in the rear brake, as listed in the general information section of this manual. The use of brake fluids other than those specified may reduce the efficiency of the braking system leading to an accident.

Failure to change the brake fluid at the interval specified in the routine maintenance schedule may reduce braking efficiency resulting in an accident.

WARNING: Never use mineral based grease in any part of the braking system or in any area where contact with the braking system is possible. Mineral based grease will damage the hydraulic seals in the calipers and master cylinders.

Damage caused by contact with mineral based grease may reduce braking efficiency resulting in an accident.

SAFETY INSTRUCTIONS

Jacking and lifting

WARNING: Always ensure that any lifting apparatus has adequate load and safety capacity for the weight to be lifted. Ensure the motorcycle is well supported to prevent any possibility of the machine falling prior to, and during lifting or jacking.

Never rely on a single means of support when working with the motorcycle. Use additional safety supports.

Do not leave tools, lifting equipment, spilt oil, etc. in a place where they could become a hazard to health. Always work in a clean, tidy area and put all tools away when the work is finished.

Precautions against damage

Avoid spilling brake fluid or battery acid on any part of the bodywork. Wash spillages off with water immediately.

Disconnect the battery earth lead before starting work, see **ELECTRICAL PRECAUTIONS**.

Always use the recommended service tool where specified.

Protect exposed bearing and sealing surfaces, and screw threads from damage.

Cleaning components

A high flash-point solvent is recommended to reduce fire hazard.

Always follow container directions regarding the use of any solvent.

Always use the recommended cleaning agent or equivalent.

Do not use degreasing equipment for components containing items which could be damaged by the use of this process. Whenever possible, clean components and the area surrounding them before removal. Always observe scrupulous cleanliness when cleaning dismantled components.

Lubrication

Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. This is because used lubricants will have lost some lubricative qualities and may contain abrasive foreign particles.

Use recommended lubricants. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended. This manual makes reference to molybdenum disulphide grease in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

Joints and joint faces

Assemble joints dry unless otherwise specified in this Manual.

If gaskets and/or jointing compound is recommended for use; remove all traces of old jointing material prior to reassembly. Do not use a tool which will damage the joint faces and smooth out any scratches or burrs on the joint faces using an oil stone. Do not allow dirt or jointing material to enter any tapped holes.

Gaskets, O-rings

Do not re-use a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

Liquid gasket, non-permanent locking agent

Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly as excessive amounts of sealer may block engine oil passages and cause serious damage.

Prior to reassembly, blow through any pipes, channels or crevices with compressed air.

WARNING: To prevent injury, always use eye, face and ear protection when using compressed air. Always wear protective gloves if the compressed air is to be directed in proximity to the skin.

Screw threads

Metric threads to ISO standard are used.

Damaged nuts, bolts and screws must always be discarded.

Castellated nuts must not be slackened back to accept a split-pin, except in those recommended cases when this forms part of an adjustment.

Do not allow oil or grease to enter blind threaded holes. The hydraulic action on screwing in the bolt or stud could split the housing.

Always tighten a nut or bolt to the recommended torque figure. Damaged or corroded threads can affect the torque reading.

Unless specified, threaded fixings must always be fitted dry (no lubrication).

WARNING: Never lubricate a thread unless instructed to do so.

When a thread of a fixing is lubricated, the thread friction is reduced. When the fixing is tightened, reduced friction will cause overtightening and possible fixing failure.

A fixing which fails in service could cause component detachment leading to loss of control and an accident.

Locking devices

Always release locking tabs and fit new locking washers, do not re-use locking tabs.

Fitting a split pin

Always fit new split-pins of the correct size for the hole in the bolt or stud. Do not slacken back castle nuts when fitting split pin.

Always fit new roll pins of an interference fit in the hole.

Circlips, retaining rings

Replace any circlips and retaining rings that are removed. Removal weakens and deforms circlips causing looseness in the circlip groove. When installing circlips and retaining rings, take care to compress or expand them only enough to install them.

Always use the correct replacement circlip as recommended in the Triumph parts catalogue.

Self locking nuts

Self-locking nuts can be re-used, providing resistance can be felt when the locking portion passes over the thread of the bolt or stud.

DO NOT re-use self-locking nuts in critical locations, e.g. suspension components. Always use the correct replacement self-locking nut.

Encapsulated bolt

An encapsulated bolt can be identified by a coloured section of thread which is treated with a locking agent.

Unless a specified repair procedure states otherwise, encapsulated bolts cannot be reused and MUST be replaced if disturbed or removed.

WARNING: Failure to replace an encapsulated bolt could lead to a dangerous riding condition. Always replace encapsulated bolts.

Oil and grease seals

Replace any oil or grease seals that are removed. Removal will cause damage to an oil seal which, if re-used, would cause an oil leak.

Ensure the surface on which the new seal is to run is free of burrs or scratches. Renew the component if the original sealing surface cannot be completely restored.

Protect the seal from any surface which could cause damage over which it has to pass when being fitted. Use a protective sleeve or tape to cover the relevant surface and avoid touching the sealing lip.

Lubricate the sealing lips with a recommended lubricant. This will help to prevent damage in initial use. On dual lipped seals, smear the area between the lips with grease.

When pressing in a seal which has manufacturer's marks, press in with the marks facing out.

Seals must be pressed into place using a suitable driver. Use of improper tools will damage the seal.

Press

A part installed using a press or driver, such as a wheel bearing, should first be coated with oil on its outer or inner circumference so that it will locate smoothly.

Ball bearing

When installing a ball bearing, the bearing race which is an interference fit should be pushed by a suitable driver. This prevents severe stress or damage to the load carrying components. Press a ball bearing until it touches the shoulder in the bore or on the shaft.

Press or drift seals to the depth of its housing, with the sealing lip facing the lubricant to be retained if the housing is shouldered, or flush with the face of the housing where no shoulder is provided.

FUEL HANDLING PRECAUTIONS

General

The following information provides basic precautions which must be observed if petrol (gasoline) is to be handled safely. It also outlines other areas of risk which must not be ignored. This information is issued for basic guidance only and, if in doubt, appropriate enquiries should be made of your local Fire Officer.

Petrol - Gasoline

When petrol (gasoline) evaporates it produces 150 times its own volume in vapour which when diluted with air becomes a readily ignitable mixture. The vapour is heavier than air and will always fall to the lowest level. It can readily be distributed throughout a workshop by air currents, consequently, even a small spillage of petrol (gasoline) is potentially very dangerous.

WARNING: Petrol (gasoline) is highly flammable and can be explosive under certain conditions. When opening the fuel tank cap always observe all the following items;

Turn the motorcycle ignition switch OFF.

Do not smoke.

Always have a fire extinguisher containing FOAM, CO^2, HALON or POWDER close at hand when handling or draining fuel or fuel systems. Fire extinguishers must also be present in areas where fuel is stored.

Always disconnect the vehicle battery, negative (black) lead first, before carrying out dismantling or draining work on a fuel system.

Whenever petrol (gasoline) is being handled, drained or stored or when fuel systems are being dismantled, make sure the area is well ventilated. All potential forms of ignition must be extinguished or removed (this includes any appliance with a pilot light). Any lead-lamps must be flame-proof and kept clear of any fuel spillage.

Warning notices must be posted at a safe distance from the site of the work to warn others that petrol is being openly handled. The notice must instruct the reader of the precautions which must be taken.

Failure to observe any of the above warnings may lead to a fire hazard which could result in personal injury.

WARNING: No one should be permitted to repair components associated with petrol/gasoline without first having specialist training on the fire hazards which may be created by incorrect installation and repair of items associated with petrol/gasoline.
Repairs carried out by untrained personnel could bring about a safety hazard leading to a risk of personal injury.

WARNING: Draining or extraction of petrol/gasoline from a vehicle fuel tank must be carried out in a well ventilated area.

The receptacle used to contain the petrol/gasoline must be more than adequate for the full amount of fuel to be extracted or drained. The receptacle should be clearly marked with its contents, and placed in a safe storage area which meets the requirements of local authority regulations.

When petrol/gasoline has been extracted or drained from a fuel tank, the precautions governing naked lights and ignition sources should be maintained.
Failure to observe any of the above warnings could bring about a safety hazard leading to a risk of personal injury.

Fuel tank removal

Fuel tanks should have a 'PETROL (GASOLINE) VAPOUR' warning label attached to them as soon as they are removed from the vehicle. In all cases, they must be stored in a secured, marked area.

Chassis repairs

WARNING: If the motorcycle is involved in an accident or collision it must be taken to an authorised Triumph dealer for repair or inspection. Any accident can cause damage to the motorcycle which, if not correctly repaired, may cause a second accident which may result in injury or death.

The frame must not be modified as any modification to the frame such as welding or drilling may weaken the frame resulting in an accident.

ELECTRICAL PRECAUTIONS

The following guidelines are intended to ensure the safety of the operator whilst preventing damage to the electrical and electronic components fitted to the motorcycle. Where necessary, specific precautions are detailed in the relevant sections of this manual which should be referred to prior to commencing repair operations.

Equipment - Prior to commencing any test procedure on the motorcycle ensure that the relevant test equipment is working correctly and any harness or connectors are in good condition, in particular mains leads and plugs.

WARNING: The ignition system produces extremely high voltages. Do not touch any part of the ignition system or any cables while the engine is running.

An electric shock caused by contact with the ignition system may lead to illness, injury or death.

WARNING: Wearers of surgically implanted heart pacemaker devices should not be in close proximity to ignition circuits and or diagnostic equipment.

The ignition system and any diagnostic equipment may interrupt the normal operation of such devices causing illness or death.

WARNING: The battery contains harmful materials. Always keep children away from the battery whether or not it is fitted in the motorcycle.
Do not jump start the battery, touch the battery cables together or reverse the polarity of the cables as any of these actions may cause a spark which would ignite battery gasses causing a risk of personal injury.

High Voltage Circuits - Whenever disconnecting live H.T. circuits always use insulated pliers. Exercise caution when measuring the voltage on the coil terminals while the engine is running, high voltage spikes can occur on these terminals.

Connectors and Harness - The engine of a motorcycle is a particularly hostile environment for electrical components and connectors. Always ensure these items are dry and oil free before disconnecting and connecting test equipment. Never force connectors apart either by using tools or by pulling on the wiring itself. Always ensure locking mechanisms are disengaged before removal and note the orientation to enable correct reconnection. Ensure that any protective covers and substances are replaced if disturbed.

Having confirmed a component to be faulty, switch off the ignition and disconnect the battery negative (black) lead first. Remove the component and support the disconnected harness. When replacing the component keep oily hands away from electrical connection areas and push connectors home until any locking mechanism becomes fully engaged.

Battery disconnecting

Before disconnecting the battery, switch off all electrical equipment.

WARNING: To prevent the risk of a battery exploding and to prevent damage to electrical components *ALWAYS* disconnect the battery negative (black) lead first. When reconnecting the battery, always connect the positive (red) lead first, then the negative (black) lead. Always disconnect the battery when working on any part of the electrical system. Failure to observe the above warnings may lead to electrical damage and a fire hazard which could cause personal injury.

Always ensure that battery leads are routed correctly and are not close to any potential chafing points.

Disciplines

Switch off the ignition prior to making any connection or disconnection in the system. An electrical surge can be caused by disconnecting 'live' connections which can damage electronic components.

Ensure hands and work surfaces are clean and free of grease, swarf, etc. as grease collects dirt which can cause tracking or high-resistance contacts.

Prior to commencing any test, and periodically during any test, touch a good earth to discharge body static. This is because some electronic components are vulnerable to static electricity.

Electrical wires

All the electrical wires are either single-colour or two-colour and, with only a few exceptions, must be connected to wires of the same colour. On any of the two-colour wires there is a greater amount of one colour and a lesser amount of a second colour. A two-colour wire is identified by first the primary colour and then the secondary colour. For example, a yellow wire with thin red stripes is referred to as a 'yellow/red' wire; it would be a 'red/yellow' wire if the colours were reversed to make red the main colour.

Inspection

Disassembled parts should be visually inspected and replaced with new ones if there are any signs of the following:

Abrasions, cracks, hardening, warping, bending, dents, scratches, colour changes, deterioration, seizure or damage of any nature.

Replacement Parts

WARNING: Only Triumph approved parts should be used to service, repair or convert Triumph motorcycles. To ensure that Triumph approved parts are used, always order parts, accessories and conversions from an authorised Triumph dealer. The fitting of non-approved parts, accessories or conversions may adversely affect the handling, stability or other aspects of the motorcycle operation which may result in an accident causing serious injury or death.

WARNING: Always have Triumph approved parts, accessories and conversions fitted by an authorised Triumph dealer. The fitment of parts, accessories and conversions by a dealer who is not an authorised Triumph dealer may affect the handling, stability or other aspects of the motorcycle operation which may result in an accident causing serious injury or death.

WARNING: Always have Triumph approved parts, accessories and conversions fitted by a trained technician. To ensure that a trained technician is used, have an authorised Triumph dealer fit the parts. The fitment of parts, accessories and conversions by personnel other than a trained technician at an authorised Triumph dealer may affect the handling, stability or other aspects of the motorcycle operation which may result in an accident causing serious injury or death.

Service data

The service data listed in this manual gives dimensions and specifications for brand new, original parts. Where it is permissible to allow a part to exceed these figures, then the service limit is given.

The terms of the motorcycle warranty will be invalidated by the fitting of other than genuine Triumph parts.

All genuine Triumph parts have the full backing of the motorcycle warranty. Triumph dealers are obliged to supply only genuine Triumph recommended parts.

Specification

Triumph are constantly seeking to improve the specification, design and production of their motorcycles and alterations take place accordingly.

While every effort has been made to ensure the accuracy of this Manual, it should not be regarded as an infallible guide to current specifications of any particular motorcycle.

Authorised Triumph Dealers are not agents of Triumph and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.

ELECTRICAL DIAGNOSIS

Introduction

For any electrical system to work, electricity must be able to flow in a complete circuit from the power source (the battery) via the components and back to the battery. No circuit means no electrical flow. Once the power has left the positive side of the battery and run through the component it must then return to the battery on its negative side (this is called earth or ground). To save on wiring, connections and space, the negative side of the battery is connected directly to the frame or engine. Around the frame and engine will be various other ground points to which the wiring coming from components will be connected. In the case of the starter motor it bolts directly to the engine, which is bolted to the frame. Therefore the frame and engine also form part of the earth return path.

OHM'S LAW

The relationship between voltage, current and resistance is defined by Ohm's Law.

- The potential of a battery is measured in Volts (V).
- The flow of current in a circuit (I) is measured in Amperes.
- The power rating of a consumer is measured in Watts (W).
- The resistance (R) of a circuit is measured in Ohms (Ω).

Ohms law, for practical work can be described as -

$$\frac{\text{Voltage}}{\text{Current}} = \text{Resistance}$$

Power is calculated by multiplying Volts x Amps -

$$\text{Watts} = \text{Volts} \times \text{Amps}$$

By transposing either of these formulae, the value of any unit can be calculated if the other two values are known.

For example, if a battery of 12V is connected to a bulb of 60W:

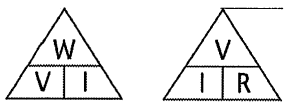
- the current flowing in the circuit can be calculated by using -

$$\frac{W}{V} = I \qquad \frac{60}{12} = 5$$

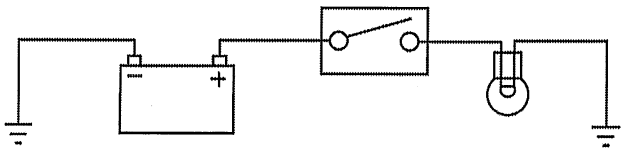
- the bulb resistance can be calculated by using -

$$\frac{V}{I} = R \qquad \frac{12}{5} = 2.4$$

To use either of the following triangles, put your finger over the value you want to find. Multiply the remaining values if side-by-side, or divide if one is over the other.



BASIC ELECTRICAL CIRCUITS



Basic Circuit Diagram

In the above circuit an electrical reservoir (the battery) is connected via a cable to a terminal on the controlling device (the switch) whose contacts are either open or closed. The other terminal on the switch is connected via a cable to the consumer (the bulb), and the other side of the bulb filament is connected to ground (earth) by another cable. The ground point is usually a part of the frame or engine, to which the battery negative terminal is also connected.

When the switch contacts are open (as shown in the diagram), the circuit is broken and no current flows. When the switch contacts are closed the circuit is made and current flows from the battery positive terminal through the switch contacts and bulb filament to ground. The frame completes the circuit to the battery negative terminal and the bulb illuminates.

Although some circuits on the circuit diagram may at first seem more complicated, it will generally be found that they can be broken down into sections which do not differ greatly from the basic circuit above.

CIRCUIT DIAGRAMS

Circuit diagrams are created to provide a 'picture' of the electrical system and to identify the route taken by each individual wire through the system, in order to identify which components it feeds and which connectors the wire runs through. Circuit diagrams are an essential tool for fault finding, as it is possible to locate start and finish points for a circuit without having to manually trace the wire through the motorcycle itself. Circuits diagrams may look confusing at first but when they are studied closely they soon become logical.
Due to the complex circuits and the number of individual wires, Triumph uses two types of circuit diagram in its service manuals.

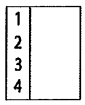
- Within the manual conventional circuit diagrams are used to show the layout of the main circuits of the motorcycle. These are: Engine management/ignition, Lighting, Starting and Charging and Auxiliary and Accessory. In these diagrams no attempt is made to show the components of the system in any particular order or position in relation to the motorcycle.
- At the back of the service manual a full colour layout circuit diagram is used to show the main electrical components in a position similar to the actual position on the motorcycle.

Both of these circuit diagrams use similar symbols to illustrate the various system components and will be accompanied by a key to circuit diagram components and wiring colour codes.
Circuit diagrams also depict the inner workings of a switch cube (I.E. which wire connects to which when a switch is turned from one position to another) so that a test of that switch can be made using the wire terminals in the connector instead of disassembling the switch itself.

GLOSSARY OF CIRCUIT DIAGRAM SYMBOLS

The following is a description of the symbols found in the circuit diagrams used in all Triumph Service Manuals.

Connector

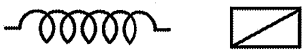


This illustration is used to show all multi-plug type electrical connectors on Triumph circuit diagrams. The numbers in the box relate to the terminal numbers of the connector pins. On ECMs with two connectors, the number would be prefixed with the letters 'A' or 'B' to identify each connector. An additional number outside the box will identify the component.

Diode

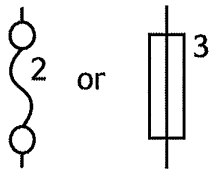
An electrical one-way valve. Diodes allow current to flow in one direction but will not allow it to return. The arrow, which forms part of the diode symbol, indicates the direction of current flow.

Electromagnetic Winding (solenoid)



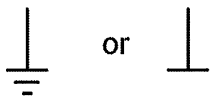
An electromagnetic winding (or solenoid) is used to convert an electrical current into a lateral movement. This can then be used to operate switches (as used in relays) or other components such as fuel injectors or secondary air injection solenoids.

Fuse



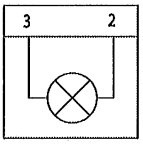
A fuse is a device which protects a circuit in the event of a fault. The fuse will 'blow' should a short circuit occur, protecting that circuit from further damage. The number next to the fuse on the circuit diagram indicates the position of the fuse in the fusebox.

Ground or Earth Point



This symbol is used to show ground points. This is the negative connection to either the frame or engine, and is a common cause of intermittent faults due to loose or corroded connections.

Lamp or Bulb

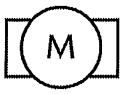


This symbol is used to show all types of light bulbs. The numbers in the box relate to the terminal numbers of the connector pins. An additional number outside the box will identify the component.

LED (Light Emitting Diode)

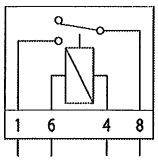
Triumph use LEDs for the alarm warning light, instrument illumination and warning lights, gear change lights and rear light/brake lights on various models.

Motor



An electric motor. This could be the starter motor or a motor within an actuator, for example within the ABS modulator.

Relay



A relay is effectively an electromagnetic switch. To close the relay contacts and complete the circuit, an electromagnet in the relay is energised which causes the relay contacts to close, making the circuit complete. Relays are used when the electrical current is too great for a mechanical switch, usually when the switching must be done quickly to prevent arcing across the switch contacts. If a mechanical switch were used, the mechanical switch contacts would quickly burn away.

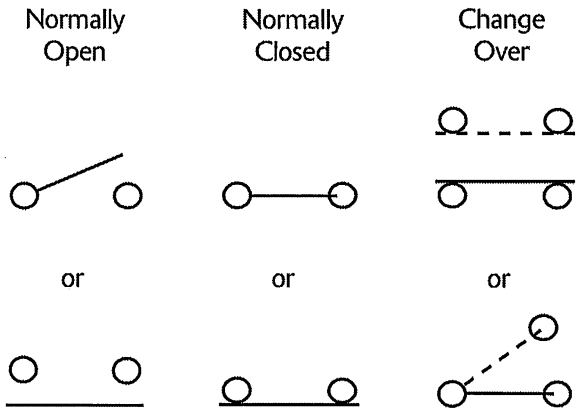
Resistor

A device placed in a cable to reduce or provide a stabilised voltage to such items as instruments and warning lights.

Splice

A hard cable joint where two or more cables are joined in the wiring harness. A potential source of both open and short circuits.

Switches

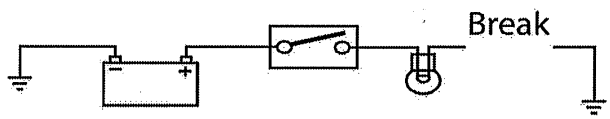


A mechanical device for completing or breaking a circuit. There are three common types of switch: Normally open, normally closed and change-over.

TRACING CIRCUITS

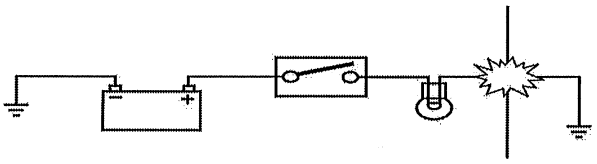
The following is a description of two types of common electrical failures, and some of the methods which may be used to find them.

Open circuit



A break in an electrical circuit - current cannot flow. Usually caused by a break in a wire or cable or by a loose connection. Open circuits can often by intermittent, making diagnosis difficult.

Short circuit



A 'short cut' in an electrical circuit - current by-passes the intended circuit, either to earth or to another, different circuit. Often caused by failure of the cable insulation due to chafing or trapping of the wire. There are two different types of short circuit - short to ground and short to Vbatt.

A short to ground means that the current is going to earth before it reaches the component it is supposed to feed. These are often caused by chafing of the harness to the frame or wires trapped between a bolted component, and will often blow the fuse on that circuit.

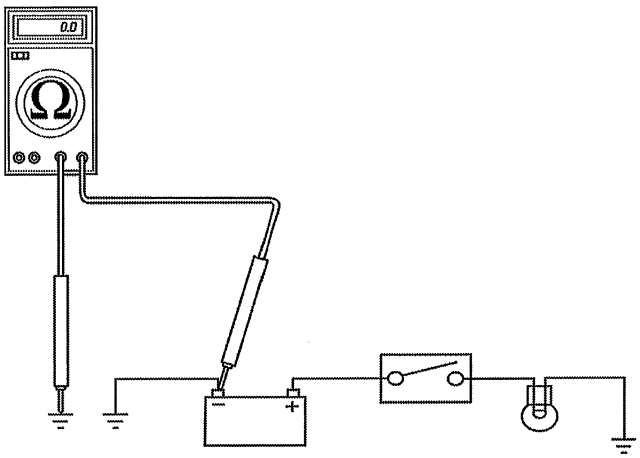
A short to Vbatt is a short to battery voltage (12 Volts) and is caused by a live power supply wire contacting an adjacent cable. Note that it is also possible for a 5 Volt sensor reference voltage to short to an adjacent circuit, which can also cause electrical failures and DTCs (Diagnostic Trouble Code) to be stored.
When tracing a wire that is suspect, carefully check the circuit diagram before starting. Remember:

- a wire may diverge at a splice and go off to feed other circuits. If these circuits are working, check for wiring faults from the splice onwards.
- the circuit diagram is not an accurate guide to the actual location of the parts when fitted on the bike. It is a schematic diagram of the circuits.
- particularly where engine management items are concerned, the circuit is only completed by the ECM. If the ECM is not connected, the circuit may register as open.

TO CHECK CONTINUITY:

CAUTION: Ensure the circuit being tested is switched off before measuring continuity. Damage to the Digital Multi Meter (DMM) may result from testing a 'live' circuit with the meter set to resistance (Ω).

In the example below, the ground circuit continuity is being tested from the battery to the frame.

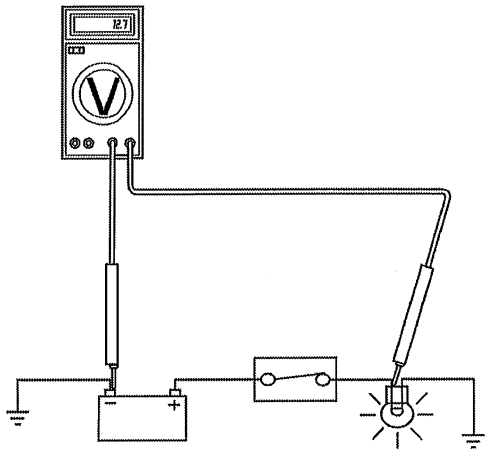


Continuity (resistance) Check

- Locate each end of the wire.
- Set the Digital Multi Meter (DMM) to resistance check (Ω).
- Probe each end of the wire.
- If there is continuity, the meter will usually bleep or register the resistance of the cable.
- A high resistance figure could indicate a dirty or corroded connection.
- If there is a break in the wire, the meter will not bleep or register a resistance.
- By probing the wire in various places, the position of a high resistance or break in the wire (open circuit) can be narrowed down until it is found.

TO MEASURE VOLTAGE:

In the example below, the circuit voltage is being measured at the bulb positive (+) terminal.



- Turn the circuit to be tested 'ON'
- Set the Digital Multi Meter (DMM) to Voltage check (V). Ensure the multi meter is set to dc volts for direct current circuits (most circuits) or ac volts for alternating current circuits (typically alternator output voltage tests).
- Set the range of the DMM to the range best suited to the voltage of the circuit being tested (typically 20 volts for most DMMs). Refer to the DMM manufacturers instructions.
- Connect the black (ground) lead of the DMM to a reliable ground connection (usually the battery or frame ground).
- Locate the positive terminal of the wire or component to be tested.
- Connect the red (positive) lead of the DMM to the positive terminal.
- Read the voltage from meter.

Splices

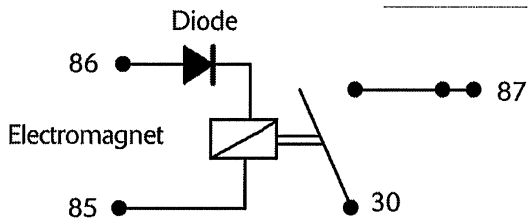
Splices are probably the most common cause of wiring faults after connectors. Splices are made where two or more wires come together and diverge in different directions, usually to feed a different circuit.
To locate a splice, it is necessary to peel back the insulation and examine the splice for its integrity. The most common fault is where one of the wires at the joint has come adrift usually causing the circuit it feeds or earths to become 'dead'.

Switches

To check a switch, set the multimeter to resistance/continuity and probe the two pins that form a closed circuit when the switch is pushed. If the switch is working correctly, the resistance should register or the meter will bleep.

Relays

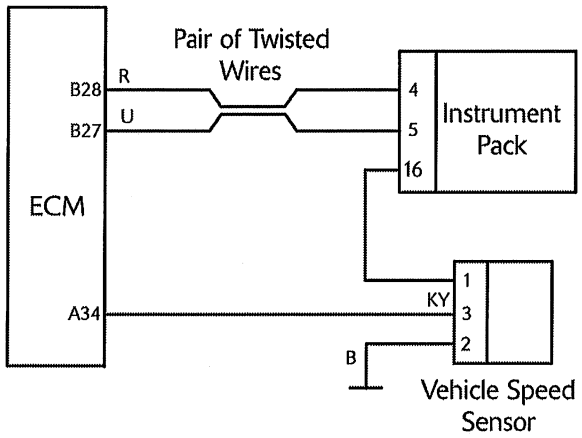
All relay cases have a circuit path engraved on them showing the circuit path across the electromagnet and the switch. Before making any checks, first note the pin designations, current paths, and whether or not there is a diode in either circuit path.



Make continuity checks across the electromagnet first, usually from pin 86 (positive) to pin 85 (negative). If a diode appears in the circuit use the diode check on the multimeter (volts scale) in the direction of current flow. If there is no diode, use the resistance check facility. An open circuit or unusually high resistance value indicates a faulty relay.
To check the switch side, apply a 12 volt supply between pins 86 and 85. With the supply connected the relay should be heard to click and there should be continuity between pins 30 and 87. An open circuit indicates a faulty relay.

CAN (Controller Area Networking)

CAN (sometimes called CANbus) is a protocol for data communication between Electronic Control Modules (ECMs). Each ECM on the network is connected by a single pair of twisted wires (or bus) which are used for the transmission of vehicle sensor data. By using CAN, the overall number of system sensors, and the amount of cabling required to allow ECMs to communicate with each other is greatly reduced.
This saves cost, weight and space, and makes the system more reliable, as the physical number of wires and connections is reduced.



Extract from the circuit diagram showing CAN connection between ECMs

CAN works by each ECM sending out 'packets' of information (such as engine speed or fuel consumption information) on to the network bus (note that the network must be free of data before any ECM is allowed to transmit). This data is given a priority according to its importance (for example 'engine speed' may have a higher priority than 'low fuel level'), so that even if two ECMs send data at the same time, high priority information is always sent first. Lower priority data is then resent after the high priority data has been received by all ECMs on the network.
The receiving ECM confirms the data has been received correctly and that the data is valid, and this information is then used by the ECM as necessary. Specific data not required by an ECM will still be received and acknowledged as correct but then disregarded (for example if an ECM does not require 'clutch switch position' information, this data packet would be ignored).
This allows for a very high speed system of communication, which is also very reliable. Should one ECM fail or transmit corrupted or otherwise incorrect messages, none of the other ECMs on the network will be affected, and after a certain time that ECM will be prevented from transmitting further messages until the fault is rectified. This stops the ECM from clogging the network with incorrect data and preventing other messages from getting through. The fault would then be reported by a DTC (Diagnostic Trouble Code).
Triumph currently use CAN for communication between the engine ECM and the instruments.

ALTERNATOR/CHARGING SYSTEM

The charging system consists of an alternator and a rectifier/ regulator assembly and the battery. The alternator is made up of two parts, the stator, which is mounted to the crankcase or the engine cover, and the rotor, mounted to the end of the crankshaft. The stator is an assembly of 18 coils, arranged into 3 phases. The rotor is a series of magnets mounted in the engine flywheel, which are arranged so as to be positioned around the outside of the stator coils. As the engine rotates the alternator produces an ac (alternating current) voltage in each of the three phases of the alternator, typically of around 35 to 40 volts ac at 4000-5000 rpm, although this figure varies between models. As the battery requires dc (direct current) voltage for correct charging, this ac voltage must be first rectified to dc current, and then regulated to the correct voltage for the battery of 14.5 +0.5 volts.

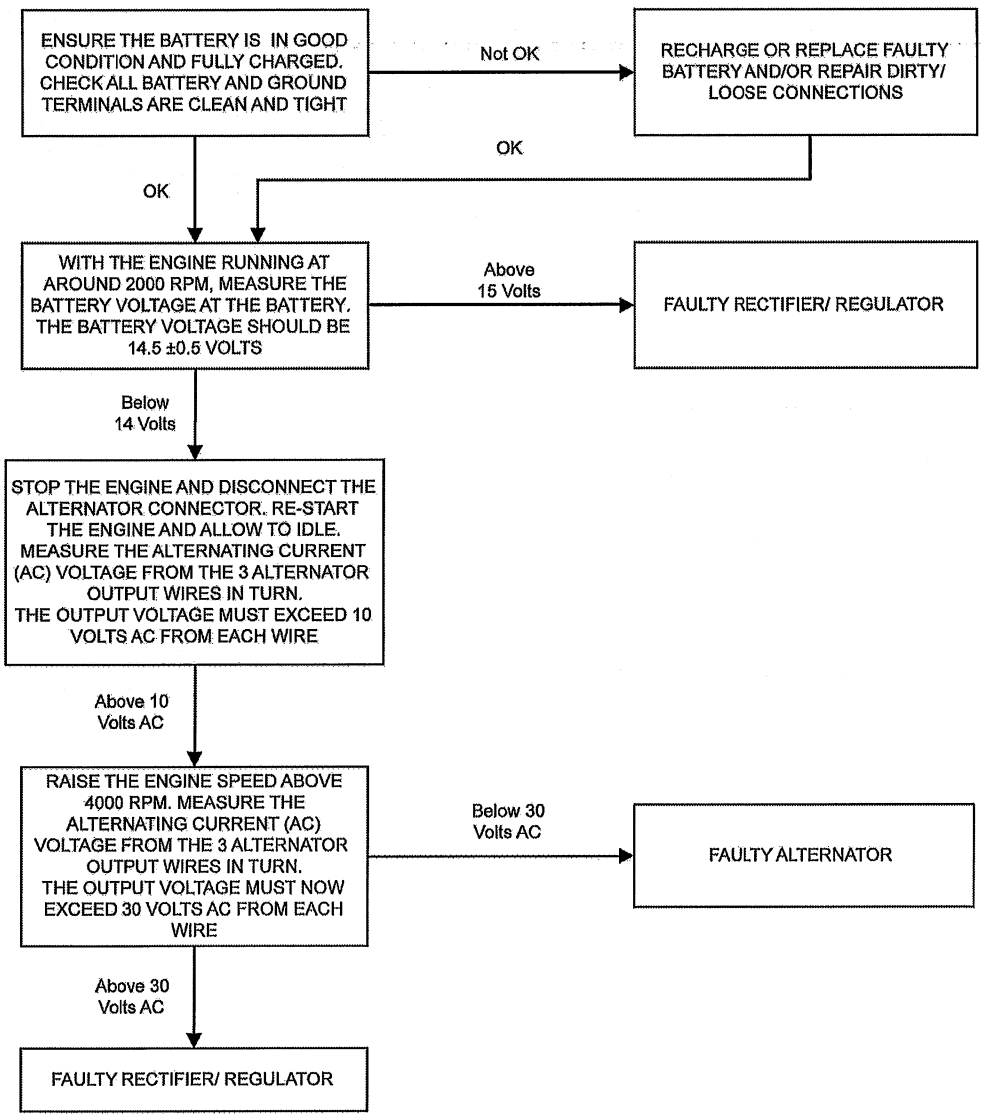
This is done by the rectifier/regulator, which uses diodes to convert the alternator output to dc volts and limit the resulting output to the correct figure required for optimal battery charging.

If the charging circuit does not operate correctly, the following basic checks must be carried out before further diagnosis is performed:

- Check the battery terminals are clean and tight.
- Check the frame and engine earth connections are clean, tight and free from corrosion.
- Ensure the battery is fully charged and in good condition.
- Check that any fuse in the circuit is not blown and is of the correct rating.

Rectify any defects as necessary.

ALTERNATOR/CHARGING SYSTEM



STARTING CIRCUIT

All Triumph models are equipped with an electric start system. This system consists of a starter relay, starter motor, starter switch, sidestand switch, engine stop switch, clutch switch and the sprag clutch. The starter motor is connected to the starter relay and the battery by heavy duty cables in order to supply the large currents required by the motor to start the engine. When the starter button is pressed the relay is energised, which then allows current to the starter motor. The starter motor will not operate unless the clutch lever is pulled in. Also, the starter will not operate if the sidestand is down, unless the transmission is in neutral. If the starter motor does not operate, the following basic checks must be carried out before further diagnosis is performed:

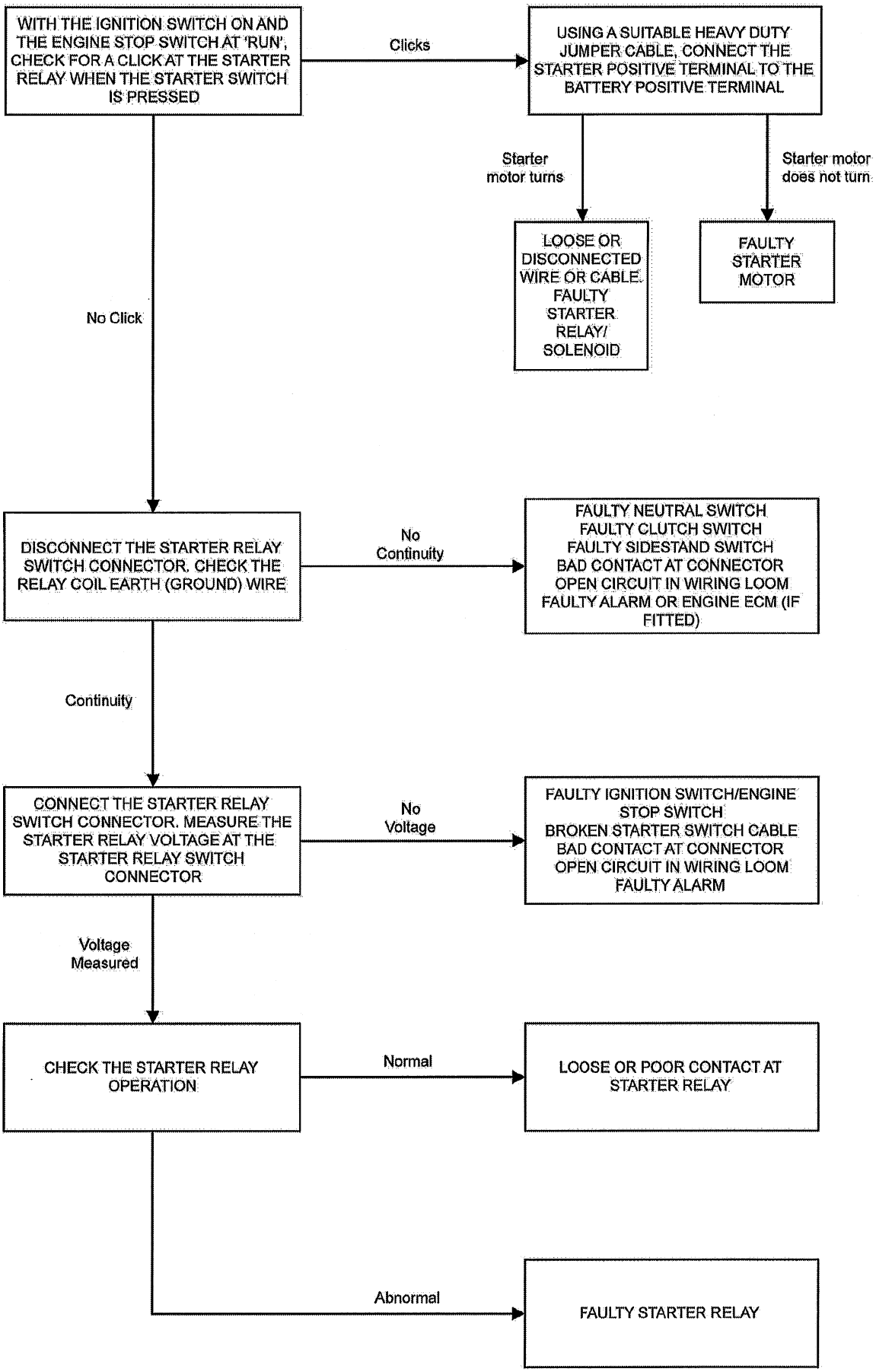
- Check the engine stop switch is in the 'RUN' position.
- Check the battery terminals are clean and tight.
- Check the frame and engine earth connections are clean, tight and free from corrosion.
- Ensure the battery is fully charged and in good condition.
- Check that any fuse in the circuit is not blown and is of the correct rating.
- Using the triumph diagnostic tool, check the operation of the neutral switch or gear position sensor (if fitted), sidestand and clutch switches.

Rectify any defects as necessary.

General Fault Finding - Starter Motor and Relay

Symptom	Possible cause
Starter relay does not click, starter motor does not turn	Battery discharged or defective
	Blown main or starter relay fuse
	Defective starter relay wiring or starter switch
	Check that the sidestand, transmission and clutch lever are positioned for engine starting I.E. transmission in neutral, clutch lever pulled in and the sidestand down
	Defective alarm system - ensure any alarm fitted is working correctly
Starter motor turns slowly	Battery discharged or defective
	Loose, corroded or dirty battery connections
	Loose, corroded or dirty starter motor or starter relay connections
	Defective starter motor
	Loose, corroded or dirty battery ground connections
Starter relay clicks but engine does turn over	Battery discharged or defective
	Crankshaft does not turn due to engine defect
	Defective starter motor
	Starter cable open circuit
	Defective starter relay
Starter motor turns but engine does not turn over	Defective sprag clutch
	Defective idler gear, reduction gear or starter motor

DIAGNOSIS - Starter Circuit

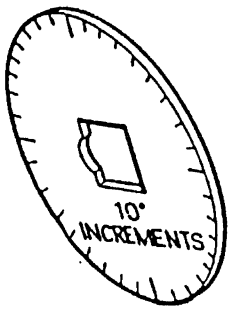


SERVICE TOOLS

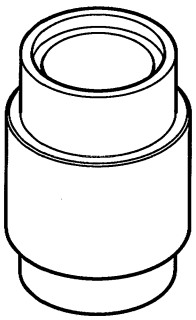
Special service tools have been developed to facilitate removal, dismantling and assembly of certain mechanical components in a practical manner without causing damage. Some operations in this service manual cannot be carried out without the aid of the relevant service tools. Where this is the case, the tools required will be described during the procedure.

Special service tools:-

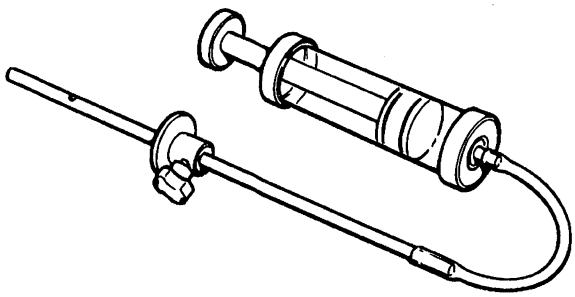
T3880105 - Angular Torque Gauge



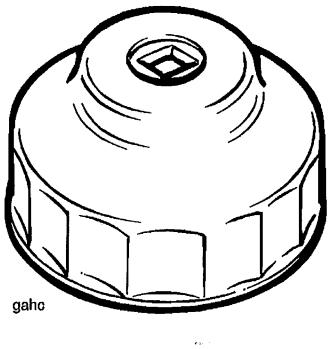
3880080-T0301 - Fork Seal/Bearing Drift



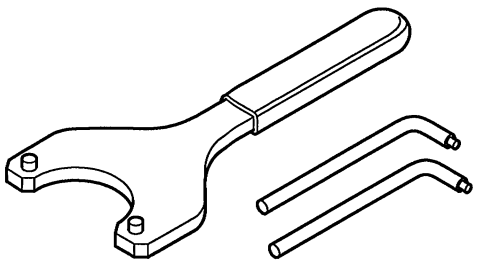
3880160-T0301 - Fork Filler/Evacuator



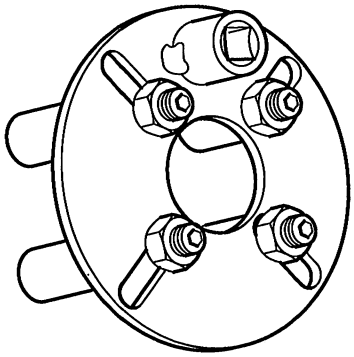
T3880312 - Oil Filter Wrench



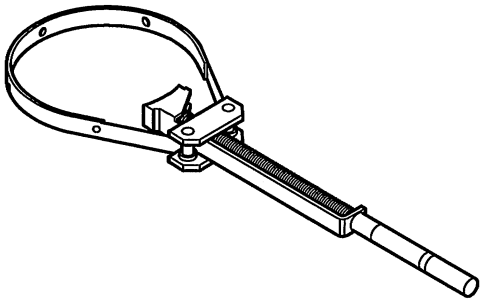
T3880330 - Camshaft backlash gear locking pins and wrench



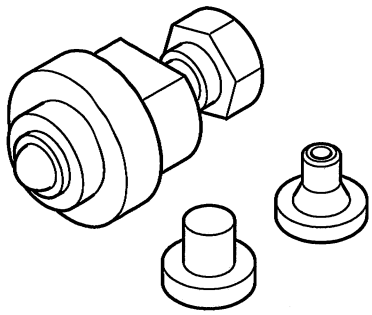
T3880360 - Clutch Holding Tool



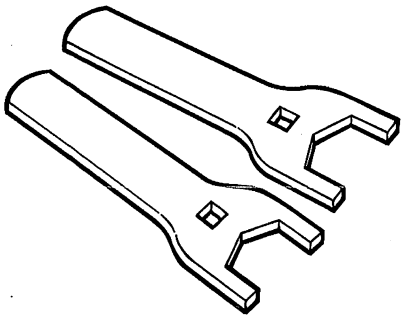
T3880375 - Alternator rotor holder



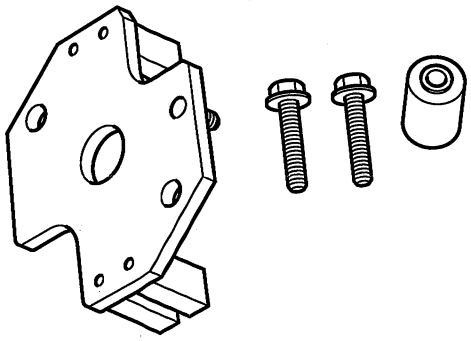
T3880325 - Alternator puller and thread-protection buttons



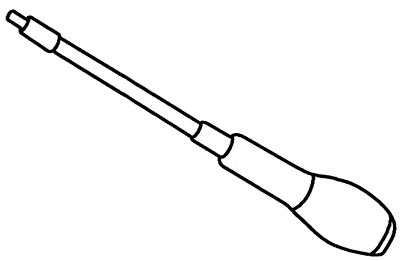
T3880140 - Head Race Adjusters



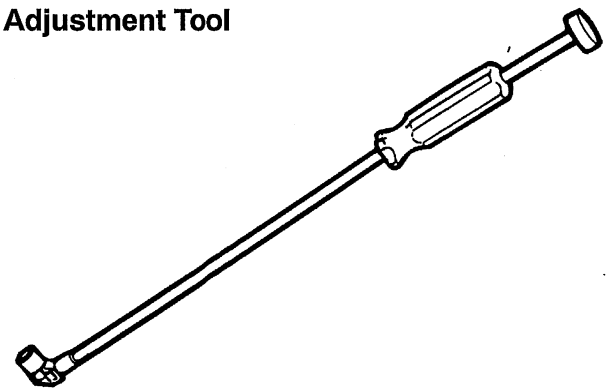
T3880014 - Clutch Alignment Jig



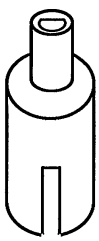
T3880089 - Idle Mixture Adjuster Tool



3880015 T0301 - Carburettor Adjustment Tool



T3880107 - Adaptor, Carbs



Full Specification		790 cc Bonneville/T100	790 cc America/Speedmaster
Engine		Twin Cylinder 8 Valve DOHC	Twin Cylinder 8 Valve DOHC
Arrangement		Transverse In-line	Transverse In-line
Displacement		790cc	790cc
Bore x Stroke		86mm x 68mm	86mm x 68mm
Compression Ratio		9.2 : 1	9.2 : 1
Cylinder Numbering		Left to Right	Left to Right
Firing Order		1-2	1-2
Firing Angle		360°	270°
Max. Power (DIN 70020)		62PS @ 7400 RPM	62PS @ 7400 RPM
Max. Torque		60Nm @ 3500 RPM	60Nm @ 3500 RPM
Cylinder Head			
Valve Head Dia.	In.	31.0 mm	31.0 mm
	Ex.	26.0 mm	26.0 mm
Valve Lift	In.	9.5 mm	9.5 mm
	Ex.	9.4 mm	9.4 mm
Valve Stem Dia.	In	5.463 to 5.478 mm (std) 5.453 mm (service limit)	5.463 to 5.478 mm (std) 5.453 mm (service limit)
	Ex.	5.451 to 5.466 mm (std) 5.441 mm (service limit)	5.451 to 5.466 mm (std) 5.441 mm (service limit)
Valve Guide Bore Dia.		5.500 to 5.515 mm (std) 5.543 mm (service limit)	5.500 to 5.515 mm (std) 5.543 mm (service limit)
Valve Seat Width (in head)		0.9 to 1.1 mm (std) 1.5 mm (service limit)	0.9 to 1.1 mm (std) 1.5 mm (service limit)
Valve Seat Width (valve)		1.27 - 1.56 mm (std) 1.56 mm (service limit)	1.27 - 1.56 mm (std) 1.56 mm (service limit)
Valve Seat Angle		45°	45°
Valve Spring Free Length		42.4 mm (std) 41.7 mm (service limit)	42.4 mm (std) 41.7 mm (service limit)
Valve Clearance	In.	0.15 to 0.20 mm	0.15 to 0.20 mm
	Ex.	0.25 to 0.30 mm	0.25 to 0.30 mm
Tappet Bucket Bore Dia.		28.015 to 28.035 mm (std) 28.050 mm (service limit)	28.015 to 28.035 mm (std) 28.050 mm (service limit)
Tappet Bucket Dia.		27.978 to 27.993 mm (std) 27.970 (service limit)	27.978 to 27.993 mm (std) 27.970 (service limit)
Valve Timing	Inlet	Open 22° BTDC (@ 1.0 mm Lift)	Open 22° BTDC (@ 1.0 mm Lift)
		Close 46° ABDC (@ 1.0 mm Lift)	Close 46° ABDC (@ 1.0 mm Lift)
		Duration 248°	Duration 248°
	Exhaust	Open 41° BBDC (@ 1.0 mm Lift)	Open 42° BBDC (@ 1.0 mm Lift)
		Close 27° ATDC (@ 1.0 mm Lift)	Close 7° ATDC (@ 1.0 mm Lift)
		Duration 248°	Duration 228°
Camshaft Journal Dia.		22.930 to 22.960 mm (std)	22.930 to 22.960 mm (std)
Camshaft Journal Clearance		0.040 - 0.091 mm (std) 0.012 mm (service limit)	0.03 to 0.07 mm (std) 0.012 mm (service limit)
Camshaft Journal Bore Dia.		23.000 to 23.021 mm	23.000 to 23.021 mm (std)
Camshaft Endfloat		Less than 0.2 mm	Less than 0.2 mm
Camshaft Run-out		Less than 0.05 mm	Less than 0.05 mm

Full Specification		790 cc Bonneville/T100	790 cc America/Speedmaster
Barrels and Pistons			
Cylinder Bore Dia.		85.991 to 86.009 mm (std) 86.034 mm (service limit)	85.991 to 86.009 mm (std) 86.034 mm (service limit)
Piston Diameter - standard		85.975 to 85.990 mm	85.975 to 85.990 mm
Piston Diameter - service limit		85.935 mm	85.935 mm
Piston Ring to Groove Clearance		0.02 mm to 0.06 mm (std) 0.075 mm (service limit)	0.02 mm to 0.06 mm (std) 0.075 mm (service limit)
Piston Ring Groove Width	Top	1.01 to 1.03 mm	1.01 to 1.03 mm
	Second	1.01 to 1.03 mm	1.01 to 1.03 mm
	Oil	2.01 to 2.03 mm	2.01 to 2.03 mm
Piston Ring End Gap in Bore	Top	0.15 mm to 0.30 mm	0.15 mm to 0.30 mm
	Second	0.30 mm to 0.45 mm	0.30 mm to 0.45 mm
	Oil	0.20 mm to 0.70 mm	0.20 mm to 0.70 mm
Gudgeon Pin Bore Dia. In Piston		19.002 to 19.008 mm (std) 19.036 mm (service limit)	19.002 to 19.008 mm (std) 19.036 mm (service limit)
Gudgeon Pin Dia.		18.995 to 19.000 mm (std) 18.985 (service limit)	18.995 to 19.000 mm (std) 18.985 (service limit)
Primary Drive			
Primary Drive	Type	Gear	Gear
	Reduction Ratio	1.74:1 (62/108)	1.74:1 (62/108)
Clutch			
Steel Plate Warpage Limit		Less than 0.15 mm	Less than 0.15 mm
Friction Plate Thickness		3.22 to 3.38 mm (std) 2.72 (service limit)	3.22 to 3.38 mm (std) 2.72 (service limit)
Clutch Actuation Method		Cable	Cable
Cable Free Play (at lever)		2 to 3 mm	2 to 3 mm
Crankshaft/Connecting rod			
Big End Journal Dia		40.946 to 40.960 (std) 40.932 mm (service limit)	40.946 to 40.960 (std) 40.932 mm (service limit)
Big End Bearing Clearance		0.036 mm to 0.066 mm (std) 0.1 mm (service limit)	0.036 mm to 0.066 mm (std) 0.1 mm (service limit)
Main Bearing Journal Dia		37.960 to 37.976 (std) 37.936 mm (service limit)	37.960 to 37.976 (std) 37.936 mm (service limit)
Main Bearing Clearance		0.019 mm to 0.044 mm (std) 0.1 mm (service limit)	0.019 mm to 0.044 mm (std) 0.1 mm (service limit)
Crankshaft Endfloat		0.05 to 0.20 mm (std) 0.40 mm (service limit)	0.05 to 0.20 mm (std) 0.40 mm (service limit)
Connecting Rod Small End Dia.		19.016 to 19.034 mm (std) 19.040 mm (service limit)	19.016 to 19.034 mm (std) 19.040 mm (service limit)
Connecting Rod Big End Side Clearance		0.15 to 0.30 mm (std) 0.50 mm (service limit)	0.15 to 0.30 mm (std) 0.50 mm (service limit)

Full Specification		790 cc Bonneville/T100	790 cc America/Speedmaster
Transmission			
Type		5 Speed Constant Mesh	5 Speed Constant Mesh
Gear Ratios	1st	2.73:1 (41/15)	2.73:1 (41/15)
	2nd	1.95:1 (37/19)	1.95:1 (37/19)
	3rd	1.55:1 (34/22)	1.55:1 (34/22)
	4th	1.29:1 (31/24)	1.29:1 (31/24)
	5th	1.07:1 (29/27)	1.07:1 (29/27)
Gear Selector Fork Thickness		5.8 to 5.9 mm (service limit 5.7 mm)	5.8 to 5.9 (service limit 5.7 mm)
Gear Selector Groove Width		6.0 to 6.1 mm (service limit 6.2 mm)	6.0 to 6.1 mm (service limit 6.2 mm)
Final Drive		Chain	Chain
Final Drive Ratio		2.53:1 (17/43)	America 2.47:1 (17/42) Speedmaster 2.625:1 (16/42)
Chain Type		DID 525 VM2 (102 link)	DID 525 VM" (112 link)
20 Link Length		Less than 321 mm	Less than 321 mm
Drive Chain Freeplay		25-35 mm	20-30 mm
Chain Lubrication		Mobil chain spray	Mobil chain spray
Lubrication			
Oil Capacity (approximate)			
	Dry fill	4.5 litres	4.5 litres
	Oil & filter change	3.8 litres	3.8 litres
	Oil change only	3.3 litres	3.3 litres
Recommended Oil		See lubrication section	See lubrication section
Oil Pressure (in main gallery)		40 psi @ 4000 rpm)@ 80°C Oil Temp)	40 psi @ 4000 rpm (@ 80°C Oil Temp)
Oil Pump Rotor Tip Clearance		Less than 0.15 mm (std)	Less than 0.15 mm (std)
		0.20 mm (service limit)	0.20 mm (service limit)
Oil Pump Body Clearance		0.15 to 0.22 mm (std)	0.15 to 0.22 mm (std)
		0.35 mm (service limit)	0.35 mm (service limit)
Oil Pump Rotor End Float		0/02 to 0.07 mm (std)	0.02 to 0.07 mm (std)
		0.10 mm (service limit)	0.10 mm (service limit)
Ignition System			
Type		Digital Inductive	Digital Inductive
Electronic Rev-Limiter		7400 rpm	7400 rpm
Pick Up Coil Air Gap		1.0 mm ±0.2 mm	1.0 mm ±0.2 mm
Spark Plug Type		NGK DPR8EA-9	NGK DPR8EA-9
Spark Plug Gap		0.8 to 0.9 mm	0.8 to 0.9 mm
Fuel System			
Fuel Type		Unleaded, 95 RON (U.S. 89 CLC/AKI)	Unleaded, 95 RON (U.S. 89 CLC/AKI)
Fuel Tank Capacity		16.0 Litres	16.6 Litres
Idle Speed		1000 ±50 rpm	1000 ±50 rpm
Idle Mixture Adjustment		See Section 9	See Section 9

Full Specification	790 cc Bonneville/T100	790 cc America/Speedmaster
Carburettors		
Type	Keihin CVK 36	Keihin CVK 36
Main Jet	110	120
Pilot Jet	40	42
Starter Jet	52	52
Main Air Jet	80	80
Needle	NAGB	NBAD
Float Height	17.0 ± 1 mm	17.0 ± 1 mm
Fuel Level	2.0 ± 1 mm above float chamber surface	2.0 ± 1 mm above float chamber surface
Suspension		
Front Fork Travel	120 mm	130 mm
Recommended Fork Oil Grade	Kayaba G10	Kayaba G10
Oil Level (fork fully compressed)	120 mm below inner tube upper surface	166 mm below inner tube upper surface
Oil Volume (dry fill)	484 cc	484 cc
Rear Wheel Travel	105 mm	96 mm
Rear Suspension Bearing Grease	Mobil Grease HP 222	Mobil Grease HP 222
Brakes		
Pad Friction Material Minimum Thickness	1.5 mm (front and rear)	1.5 mm (front and rear)
Front Disc Dia.	310 mm	310 mm
Front Disc Thickness	5.0 mm (service limit 4.5mm)	5.0 mm (service limit 4.5mm)
Front Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Front Disc Run-out - service limit	0.30 mm	0.30 mm
Rear Disc Thickness	6.0 mm (service limit 5.0mm)	6.0 mm (service limit 5.0mm)
Rear Disc Dia	255 mm	285 mm
Rear Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Rear Disc Run-out - service limit	0.30 mm	0.30 mm
Recommended Fluid	Mobil Universal Brake Fluid DOT4	Mobil Universal Brake Fluid DOT4
Wheels and Tyres		
Wheel Rim Axial Run-out	0.6 mm	0.6 mm
Wheel Rim Radial Run-out	0.6 mm	0.6mm
Tyres	See owner's handbook	See owner's handbook
Tyre Pressures	See section 14	See section 14
Front Tyre Tread Depth min.	2.0 mm	2.0 mm
Rear Tyre Tread Depth min.	2.0 mm (3.0 mm > 80 mph/130 kmh)	2.0 mm (3.0 mm > 80 mph/130 kmh)

WARNING: Triumph motorcycles must not be operated above the legal road speed limit except in authorised closed course conditions.

Full Specification	790 cc Bonneville/T100	790 cc America/Speedmaster
Frame		
Overall Length	2250 mm	2424 mm
Overall Width	860 mm	955 mm
Overall Height	1105 mm	1184 mm
Wheelbase	1493 mm	1655 mm
Seat Height	775 mm	720 mm
Castor	29°	33.3°
Trail	117 mm	153 mm
Dry Weight	205 kg	226 kg (America) 229 kg (Speedmaster)
Max. Payload (rider, passenger, luggage & accessories)	200 kg	200 kg
Electrical Equipment		
Battery Type	Sealed	Sealed
Battery Rating	12V-10 Ah	12V-10 Ah
Alternator Rating	27A	27 Ah
Fuses #1	Not used	10A
#2	30A	30A
#3	10A	10A
#4	5A	10A
#5	15A	15A
#6	Not used	Not used
#7	10A	10A
#8	5A	5A
#9	10A	10A
#10	5A	5A
#11	30A	30A

Full Specification		865 cc Bonneville T100	865 cc Speedmaster
Engine		Twin Cylinder 8 Valve DOHC	Twin Cylinder 8 Valve DOHC
Arrangement		Transverse In-line	Transverse In-line
Displacement		865cc	865cc
Bore x Stroke		90mm x 68mm	90mm x 68mm
Compression Ratio		9.2 : 1	9.2 : 1
Cylinder Numbering		Left to Right	Left to Right
Firing Order		1-2	1-2
Firing Angle		360°	270°
Max. Power (DIN 70020)		64PS @ 7250 RPM	55PS @ 6500 RPM
Max. Torque		68Nm @ 6000 RPM	68Nm @ 3500 RPM
Cylinder Head			
Valve Head Dia.	In.	31.0 mm	31.0 mm
	Ex.	26.0 mm	26.0 mm
Valve Lift	In.	9.5 mm	9.5 mm
	Ex.	9.4 mm	9.4 mm
Valve Stem Dia.	In	5.463 to 5.478 mm (std) 5.453 mm (service limit)	5.463 to 5.478 mm (std) 5.453 mm (service limit)
	Ex.	5.451 to 5.466 mm (std) 5.441 mm (service limit)	5.451 to 5.466 mm (std) 5.441 mm (service limit)
Valve Guide Bore Dia.		5.500 to 5.515 mm (std) 5.543 mm (service limit)	5.500 to 5.515 mm (std) 5.543 mm (service limit)
Valve Seat Width (in head)		0.9 to 1.1 mm (std) 1.5 mm (service limit)	0.9 to 1.1 mm (std) 1.5 mm (service limit)
Valve Seat Width (valve)		1.27 - 1.56 mm (std) 1.56 mm (service limit)	1.27 - 1.56 mm (std) 1.56 mm (service limit)
Valve Seat Angle		45°	45°
Valve Spring Free Length		42.4 mm (std) 41.7 mm (service limit)	42.4 mm (std) 41.7 mm (service limit)
Valve Clearance	In.	0.15 to 0.20 mm	0.15 to 0.20 mm
	Ex.	0.25 to 0.30 mm	0.25 to 0.30 mm
Tappet Bucket Bore Dia.		28.015 to 28.035 mm (std) 28.050 mm (service limit)	28.015 to 28.035 mm (std) 28.050 mm (service limit)
Tappet Bucket Dia.		27.978 to 27.993 mm (std) 27.970 (service limit)	27.978 to 27.993 mm (std) 27.970 (service limit)
Valve Timing	Inlet	Open 4° BTDC (@ 1.0 mm Lift)	Open 4° BTDC (@ 1.0 mm Lift)
		Close 48° ABDC (@ 1.0 mm Lift)	Close 28° ABDC (@ 1.0 mm Lift)
		Duration 232°	Duration 212°
	Exhaust	Open 33° BBDC (@ 1.0 mm Lift)	Open 38° BBDC (@ 1.0 mm Lift)
		Close 7° ATDC (@ 1.0 mm Lift)	Close 7° BTDC (@ 1.0 mm Lift)
		Duration 220°	Duration 212°
Camshaft Journal Dia.		22.930 to 22.960 mm (std)	22.930 to 22.960 mm (std)
Camshaft Journal Clearance		0.040 - 0.091 mm (std) 0.012 mm (service limit)	0.03 to 0.07 mm (std) 0.012 mm (service limit)
Camshaft Journal Bore Dia.		23.000 to 23.021 mm	23.000 to 23.021 mm (std)
Camshaft Endfloat		Less than 0.2 mm	Less than 0.2 mm
Camshaft Run-out		Less than 0.05 mm	Less than 0.05 mm

Full Specification		865 cc Bonneville T100	865 cc Speedmaster
Barrels and Pistons			
Cylinder Bore Dia.		89.991 to 90.009 mm (std) 90.034 mm (service limit)	89.991 to 90.009 mm (std) 90.034 mm (service limit)
Piston Diameter - standard		89.972 to 89.988 mm	89.972 to 89.988 mm
Piston Diameter - service limit		89.933 mm	89.933 mm
Piston Ring to Groove Clearance		0.02 mm to 0.06 mm (std) 0.075 mm (service limit)	0.02 mm to 0.06 mm (std) 0.075 mm (service limit)
Piston Ring Groove Width	Top	1.01 to 1.03 mm	1.01 to 1.03 mm
	Second	1.01 to 1.03 mm	1.01 to 1.03 mm
	Oil	2.01 to 2.03 mm	2.01 to 2.03 mm
Piston Ring End Gap in Bore	Top	0.15 mm to 0.30 mm	0.15 mm to 0.30 mm
	Second	0.30 mm to 0.45 mm	0.30 mm to 0.45 mm
	Oil	0.20 mm to 0.70 mm	0.20 mm to 0.70 mm
Gudgeon Pin Bore Dia. In Piston		19.002 to 19.008 mm (std) 19.030 mm (service limit)	19.002 to 19.008 mm (std) 19.030 mm (service limit)
Gudgeon Pin Dia.		18.995 to 19.000 mm (std) 18.990 (service limit)	18.995 to 19.000 mm (std) 18.990 (service limit)
Primary Drive			
Primary Drive	Type	Gear	Gear
	Reduction Ratio	1.74:1 (62/108)	1.74:1 (62/108)
Clutch			
Steel Plate Warpage Limit		Less than 0.15 mm	Less than 0.15 mm
Friction Plate Thickness		3.22 to 3.38 mm (std) 2.72 (service limit)	3.22 to 3.38 mm (std) 2.72 (service limit)
Clutch Actuation Method		Cable	Cable
Cable Free Play (at lever)		2 to 3 mm	2 to 3 mm
Crankshaft/Connecting rod			
Big End Journal Dia		40.946 to 40.960 (std)	40.946 to 40.960 (std)
		40.932 mm (service limit)	40.932 mm (service limit)
Big End Bearing Clearance		0.036 mm to 0.066 mm (std)	0.036 mm to 0.066 mm (std)
		0.1 mm (service limit)	0.1 mm (service limit)
Main Bearing Journal Dia		37.960 to 37.976 (std)	37.960 to 37.976 (std)
		37.936 mm (service limit)	37.936 mm (service limit)
Main Bearing Clearance		0.019 mm to 0.044 mm (std)	0.019 mm to 0.044 mm (std)
		0.1 mm (service limit)	0.1 mm (service limit)
Crankshaft Endfloat		0.05 to 0.20 mm (std)	0.05 to 0.20 mm (std)
		0.40 mm (service limit)	0.40 mm (service limit)
Connecting Rod Small End Dia.		19.016 to 19.034 mm (std) 19.040 mm (service limit)	19.016 to 19.034 mm (std) 19.040 mm (service limit)
Connecting Rod Big End Side Clearance		0.15 to 0.30 mm (std) 0.50 mm (service limit)	0.15 to 0.30 mm (std) 0.50 mm (service limit)

Full Specification		865 cc Bonneville T100	865 cc Speedmaster
Transmission			
Type		5 Speed Constant Mesh	5 Speed Constant Mesh
Gear Ratios	1st	2.73:1 (41/15)	2.73:1 (41/15)
	2nd	1.95:1 (37/19)	1.95:1 (37/19)
	3rd	1.55:1 (34/22)	1.55:1 (34/22)
	4th	1.29:1 (31/24)	1.29:1 (31/24)
	5th	1.07:1 (29/27)	1.07:1 (29/27)
Gear Selector Fork Thickness		5.8 to 5.9 mm (service limit 5.7 mm)	5.8 to 5.9 (service limit 5.7 mm)
Gear Selector Groove Width		6.0 to 6.1 mm (service limit 6.2 mm)	6.0 to 6.1 mm (service limit 6.2 mm)
Final Drive		Chain	Chain
Final Drive Ratio		2.39:1 (18/43)	2.687:1 (16/43)
Chain Type		DID 525 VM2 (102 link)	DID 525 VM2 (112 link)
20 Link Length		Less than 321 mm	Less than 321 mm
Drive Chain Freeplay		25-35 mm	20-30 mm
Chain Lubrication		Mobil chain spray	Mobil chain spray
Lubrication			
Oil Capacity (approximate)			
	Dry fill	4.5 litres	4.5 litres
	Oil & filter change	3.8 litres	3.8 litres
	Oil change only	3.3 litres	3.3 litres
Recommended Oil		See lubrication section	See lubrication section
Oil Pressure (in main gallery)		40 psi @ 4000 rpm)@ 80°C Oil Temp)	40 psi @ 4000 rpm (@ 80°C Oil Temp)
Oil Pump Rotor Tip Clearance		Less than 0.15 mm (std)	Less than 0.15 mm (std)
		0.20 mm (service limit)	0.20 mm (service limit)
Oil Pump Body Clearance		0.15 to 0.22 mm (std)	0.15 to 0.22 mm (std)
		0.35 mm (service limit)	0.35 mm (service limit)
Oil Pump Rotor End Float		0/02 to 0.07 mm (std)	0.02 to 0.07 mm (std)
		0.10 mm (service limit)	0.10 mm (service limit)
Ignition System			
Type		Digital Inductive	Digital Inductive
Electronic Rev-Limiter		8000 rpm	8000 rpm
Pick Up Coil Air Gap		1.0 mm ±0.2 mm	1.0 mm ±0.2 mm
Spark Plug Type		NGK DPR8EA-9	NGK DPR8EA-9
Spark Plug Gap		0.8 to 0.9 mm	0.8 to 0.9 mm
Fuel System			
Fuel Type		Unleaded, 95 RON (U.S. 89 CLC/AKI)	Unleaded, 95 RON (U.S. 89 CLC/AKI)
Fuel Tank Capacity		16.0 Litres	16.6 Litres
Idle Speed		1000 ±50 rpm	1000 ±50 rpm
Idle Mixture Adjustment		See Section 9	See Section 9

Full Specification	865 cc Bonneville T100	865 cc Speedmaster
Carburettors		
Type	Keihin CVK 36	Keihin CVK 36
Main Jet	110	120
Pilot Jet	40	40
Starter Jet	55	55
Main Air Jet	80	100
Needle	NBZT	NBZY
Float Height	17.0 ± 1 mm	17.0 ± 1 mm
Fuel Level	2.0 ± 1 mm above float chamber surface	2.0 ± 1 mm above float chamber surface
Suspension		
Front Fork Travel	120 mm	130 mm
Recommended Fork Oil Grade	Kayaba G10	Kayaba G10
Oil Level (fork fully compressed)	120 mm below inner tube upper surface	166 mm below inner tube upper surface
Oil Volume (dry fill)	484 cc	484 cc
Rear Wheel Travel	105 mm	96 mm
Rear Suspension Bearing Grease	Mobil Grease HP 222	Mobil Grease HP 222
Brakes		
Pad Friction Material Minimum Thickness	1.5 mm (front and rear)	1.5 mm (front and rear)
Front Disc Dia.	310 mm	310 mm
Front Disc Thickness	5.5 mm (service limit 5.0mm)	5.5 mm (service limit 5.5mm)
Front Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Front Disc Run-out - service limit	0.30 mm	0.30 mm
Rear Disc Dia	255 mm	285 mm
Rear Disc Thickness	6.0 mm (service limit 5.0mm)	6.0 mm (service limit 5.0mm)
Rear Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Rear Disc Run-out - service limit	0.30 mm	0.30 mm
Recommended Fluid	Mobil Universal Brake Fluid DOT4	Mobil Universal Brake Fluid DOT4
Wheels and Tyres		
Wheel Rim Axial Run-out	1.0 mm	0.6 mm
Wheel Rim Radial Run-out	1.0 mm	0.6 mm
Tyres	See owner's handbook	See owner's handbook
Tyre Pressures	See section 14	See section 14
Front Tyre Tread Depth min.	2.0 mm	2.0 mm
Rear Tyre Tread Depth min.	2.0 mm (3.0 mm > 80 mph/130 kmh)	2.0 mm (3.0 mm > 80 mph/130 kmh)

WARNING: Triumph motorcycles must not be operated above the legal road speed limit except in authorised closed course conditions.

Full Specification		865 cc Bonneville T100	865 cc Speedmaster
Frame			
Overall Length		2243 mm	2424 mm
Overall Width		860 mm	955 mm
Overall Height		1105 mm	1184 mm
Wheelbase		1484 mm	1655 mm
Seat Height		775 mm	720 mm
Castor		28°	33.3°
Trail		110 mm	153 mm
Dry Weight		205 kg	229 kg
Max. Payload (rider, passenger, luggage & accessories)		200 kg	200 kg
Electrical Equipment			
Battery Type		Sealed	Sealed
Battery Rating		12V-10 Ah	12V-10 Ah
Alternator Rating		27A	27 Ah
Fuses	#1	Not used	10A
	#2	30A	30A
	#3	10A	10A
	#4	5A	10A
	#5	15A	15A
	#6	Not used	Not used
	#7	10A	10A
	#8	5A	5A
	#9	10A	10A
	#10	5A	5A
	#11	30A	30A

Full Specification		Scrambler	Thruxton
Engine		Twin Cylinder 8 Valve DOHC	Twin Cylinder 8 Valve DOHC
Arrangement		Transverse In-line	Transverse In-line
Displacement		865cc	865cc
Bore x Stroke		90mm x 68mm	90mm x 68mm
Compression Ratio		9.2 : 1	9.2 : 1
Cylinder Numbering		Left to Right	Left to Right
Firing Order		1-2	1-2
Firing Angle		270°	360°
Max. Power (DIN 70020)		55PS @ 7000 RPM	70PS @ 7250 RPM
Max. Torque		69Nm @ 5000 RPM	72Nm @ 5750 RPM
Cylinder Head			
Valve Head Dia.	In.	31.0 mm	31.0 mm
	Ex.	26.0 mm	26.0 mm
Valve Lift	In.	9.5 mm	9.5 mm
	Ex.	9.4 mm	9.4 mm
Valve Stem Dia.	In	5.463 to 5.478 mm (std) 5.453 mm (service limit)	5.463 to 5.478 mm (std) 5.453 mm (service limit)
	Ex.	5.451 to 5.466 mm (std) 5.441 mm (service limit)	5.451 to 5.466 mm (std) 5.441 mm (service limit)
Valve Guide Bore Dia.		5.500 to 5.515 mm (std) 5.543 mm (service limit)	5.500 to 5.515 mm (std) 5.543 mm (service limit)
Valve Seat Width (in head)		0.9 to 1.1 mm (std) 1.5 mm (service limit)	0.9 to 1.1 mm (std) 1.5 mm (service limit)
Valve Seat Width (valve)		1.27 - 1.56 mm (std) 1.56 mm (service limit)	1.27 - 1.56 mm (std) 1.56 mm (service limit)
Valve Seat Angle		45°	45°
Valve Spring Free Length		42.4 mm (std) 41.7 mm (service limit)	42.4 mm (std) 41.7 mm (service limit)
Valve Clearance	In.	0.15 to 0.20 mm	0.15 to 0.20 mm
	Ex.	0.25 to 0.30 mm	0.25 to 0.30 mm
Tappet Bucket Bore Dia.		28.015 to 28.035 mm (std) 28.050 mm (service limit)	28.015 to 28.035 mm (std) 28.050 mm (service limit)
Tappet Bucket Dia.		27.978 to 27.993 mm (std) 27.970 (service limit)	27.978 to 27.993 mm (std) 27.970 (service limit)
Valve Timing	Inlet	Open 6° ATDC (@ 1.0 mm Lift)	Open 6° BTDC (@ 1.0 mm Lift)
		Close 142° BTDC (@ 1.0 mm Lift)	Close 50° ABDC (@ 1.0 mm Lift)
		Duration 212°	Duration 235°
	Exhaust	Open 142° ATDC (@ 1.0 mm Lift)	Open 33° BBDC (@ 1.0 mm Lift)
		Close 7° BTDC (@ 1.0 mm Lift)	Close 8° ATDC (@ 1.0 mm Lift)
		Duration 212°	Duration 221°
Camshaft Journal Dia.		22.930 to 22.960 mm (std)	22.930 to 22.960 mm (std)
Camshaft Journal Clearance		0.03 - 0.07 mm (std) 0.012 mm (service limit)	0.040 - 0.091 mm (std) 0.012 mm (service limit)
Camshaft Journal Bore Dia.		23.000 to 23.021 mm	23.000 to 23.021 mm
Camshaft Endfloat		Less than 0.2 mm	Less than 0.2 mm
Camshaft Run-out		Less than 0.05 mm	Less than 0.05 mm

Full Specification		Scrambler	Thruxton
Barrels and Pistons			
Cylinder Bore Dia.		89.991 to 90.009 mm (std) 90.034 mm (service limit)	89.991 to 90.009 mm (std) 90.034 mm (service limit)
Piston Diameter - standard		89.972 to 89.988 mm	89.972 to 89.988 mm
Piston Diameter - service limit		89.933 mm	89.933 mm
Piston Ring to Groove Clearance		0.02 mm to 0.06 mm (std) 0.075 mm (service limit)	0.02 mm to 0.06 mm (std) 0.075 mm (service limit)
Piston Ring Groove Width	Top	1.01 to 1.03 mm	1.01 to 1.03 mm
	Second	1.01 to 1.03 mm	1.01 to 1.03 mm
	Oil	2.01 to 2.03 mm	2.01 to 2.03 mm
Piston Ring End Gap in Bore	Top	0.15 mm to 0.30 mm	0.15 mm to 0.30 mm
	Second	0.30 mm to 0.45 mm	0.30 mm to 0.45 mm
	Oil	0.20 mm to 0.70 mm	0.20 mm to 0.70 mm
Gudgeon Pin Bore Dia. In Piston		19.002 to 19.008 mm (std) 19.030 mm (service limit)	19.002 to 19.008 mm (std) 19.030 mm (service limit)
Gudgeon Pin Dia.		18.995 to 19.000 mm (std) 18.990 (service limit)	18.995 to 19.000 mm (std) 18.990 (service limit)
Primary Drive			
Primary Drive	Type	Gear	Gear
	Reduction Ratio	1.74:1 (62/108)	1.74:1 (62/108)
Clutch			
Steel Plate Warpage Limit		Less than 0.15 mm	Less than 0.15 mm
Friction Plate Thickness		3.22 to 3.38 mm (std) 2.72 (service limit)	3.22 to 3.38 mm (std) 2.72 (service limit)
Clutch Actuation Method		Cable	Cable
Cable Free Play (at lever)		2 to 3 mm	2 to 3 mm
Crankshaft/Connecting rod			
Big End Journal Dia		40.946 to 40.960 (std) 40.932 mm (service limit)	40.946 to 40.960 (std) 40.932 mm (service limit)
Big End Bearing Clearance		0.036 mm to 0.066 mm (std) 0.1 mm (service limit)	0.036 mm to 0.066 mm (std) 0.1 mm (service limit)
Main Bearing Journal Dia		37.960 to 37.976 (std) 37.936 mm (service limit)	37.960 to 37.976 (std) 37.936 mm (service limit)
Main Bearing Clearance		0.019 mm to 0.044 mm (std) 0.1 mm (service limit)	0.019 mm to 0.044 mm (std) 0.1 mm (service limit)
Crankshaft Endfloat		0.05 to 0.20 mm (std) 0.40 mm (service limit)	0.05 to 0.20 mm (std) 0.40 mm (service limit)
Connecting Rod Small End Dia.		19.016 to 19.034 mm (std) 19.040 mm (service limit)	19.016 to 19.034 mm (std) 19.040 mm (service limit)
Connecting Rod Big End Side Clearance		0.15 to 0.30 mm (std) 0.50 mm (service limit)	0.15 to 0.30 mm (std) 0.50 mm (service limit)

Full Specification		Scrambler	Thruxton
Transmission			
Transmission			
Type		5 Speed Constant Mesh	5 Speed Constant Mesh
Gear Ratios	1st	2.73:1 (41/15)	2.73:1 (41/15)
	2nd	1.95:1 (37/19)	1.95:1 (37/19)
	3rd	1.55:1 (34/22)	1.55:1 (34/22)
	4th	1.29:1 (31/24)	1.29:1 (31/24)
	5th	1.07:1 (29/27)	1.07:1 (29/27)
Gear Selector Fork Thickness		5.8 to 5.9 mm (service limit 5.7 mm)	5.8 to 5.9 mm (service limit 5.7 mm)
Gear Selector Groove Width		6.0 to 6.1 mm (service limit 6.2 mm)	6.0 to 6.1 mm (service limit 6.2 mm)
Final Drive		Chain	Chain
Final Drive Ratio		2.39:1 (18/43)	2.39:1 (18/43)
Chain Type		DID 525 VM2 (106 link)	DID 525 VM2 (104 link)
20 Link Length		Less than 321 mm	Less than 321 mm
Drive Chain Freeplay		20-30 mm	25-35 mm
Chain Lubrication		Mobil chain spray	Mobil chain spray
Lubrication			
Oil Capacity (approximate)			
	Dry fill	4.5 litres	4.5 litres
	Oil & filter change	3.8 litres	3.8 litres
	Oil change only	3.3 litres	3.3 litres
Recommended Oil		See lubrication section	See lubrication section
Oil Pressure (in main gallery)		40 psi @ 4000 rpm)@ 80°C Oil Temp)	40 psi @ 4000 rpm)@ 80°C Oil Temp)
Oil Pump Rotor Tip Clearance		Less than 0.15 mm (std)	Less than 0.15 mm (std)
		0.20 mm (service limit)	0.20 mm (service limit)
Oil Pump Body Clearance		0.15 to 0.22 mm (std)	0.15 to 0.22 mm (std)
		0.35 mm (service limit)	0.35 mm (service limit)
Oil Pump Rotor End Float		0/02 to 0.07 mm (std)	0/02 to 0.07 mm (std)
		0.10 mm (service limit)	0.10 mm (service limit)
Ignition System			
Type		Digital Inductive	Digital Inductive
Electronic Rev-Limiter		8000 rpm	8000 rpm
Pick Up Coil Air Gap		1.0 mm ±0.2 mm	1.0 mm ±0.2 mm
Spark Plug Type		NGK DPR8EA-9	NGK DPR8EA-9
Spark Plug Gap		0.8 to 0.9 mm	0.8 to 0.9 mm
Fuel System			
Fuel Type		Unleaded, 95 RON (U.S. 89 CLC/AKI)	Unleaded, 95 RON (U.S. 89 CLC/AKI)
Fuel Tank Capacity		16.0 Litres	16.0 Litres
Idle Speed		1000 ±50 rpm	1000 ±50 rpm
Idle Mixture Adjustment		See Section 9	See Section 9

Full Specification	Scrambler	Thruxton
Carburettors		
Type	Keihin CVK 36	Keihin CVK 36
Main Jet	120	110
Pilot Jet	40	40
Starter Jet	55	55
Main Air Jet	100	80
Needle	N3RL	NBZT
Float Height	17.0 ± 1 mm	17.0 ± 1 mm
Fuel Level	2.0 ± 1 mm above float chamber surface	2.0 ± 1 mm above float chamber surface
Suspension		
Front Fork Travel	120 mm	120 mm
Recommended Fork Oil Grade	Kayaba G10	Kayaba G10
Oil Level (fork fully compressed)	123	143 mm below inner tube upper surface
Oil Volume (dry fill)	517 cc	466 cc
Rear Wheel Travel	105 mm	105 mm
Rear Suspension Bearing Grease	Mobil Grease HP 222	Mobil Grease HP 222
Brakes		
Pad Friction Material Minimum Thickness	1.5 mm (front and rear)	1.5 mm (front and rear)
Front Disc Dia.	310 mm	320 mm
Front Disc Thickness	5.5 mm (service limit 5.0mm)	5.0 mm (service limit 4.5mm)
Front Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Front Disc Run-out - service limit	0.30 mm	0.30 mm
Rear Disc Dia	255 mm	255 mm
Rear Disc Thickness	6.0 mm (service limit 5.0mm)	6.0 mm (service limit 5.0mm)
Rear Disc Run-out - standard	Less than 0.15 mm	Less than 0.15 mm
Rear Disc Run-out - service limit	0.30 mm	0.30 mm
Recommended Fluid	Mobil Universal Brake Fluid DOT4	Mobil Universal Brake Fluid DOT4
Wheels and Tyres		
Wheel Rim Axial Run-out	1.0 mm	1.0 mm
Wheel Rim Radial Run-out	1.0 mm	1.0 mm
Tyres	See owner's handbook	See owner's handbook
Tyre Pressures.	See section 14	See section 14
Front Tyre Tread Depth min.	2.0 mm	2.0 mm
Rear Tyre Tread Depth min.	2.0 mm (3.0 mm > 80 mph/130 kmh)	2.0 mm (3.0 mm > 80 mph/130 kmh)

WARNING: Triumph motorcycles must not be operated above the legal road speed limit except in authorised closed course conditions.

Full Specification		Scrambler	Thruxton
Frame			
Overall Length		2213 mm	2212 mm
Overall Width		840 mm	714 mm
Overall Height		1202 mm	1170 mm
Wheelbase		1500 mm	1477 mm
Seat Height		825 mm	790 mm
Castor		27.8°	27°
Trail		105 mm	97 mm
Dry Weight		205 kg	205 kg
Max. Payload (rider, passenger, luggage & accessories)		200 kg	200 kg
Electrical Equipment			
Battery Type		Sealed	Sealed
Battery Rating		12V-10 Ah	12V-10 Ah
Alternator Rating		27A	27A
Fuses	#1	Not used	Not used
	#2	30A	30A
	#3	10A	10A
	#4	5A	5A
	#5	15A	15A
	#6	Not used	Not used
	#7	10A	10A
	#8	5A	5A
	#9	10A	10A
	#10	5A	5A
	#11	30A	30A

TORQUE WRENCH SETTINGS - AMERICA & SPEEDMASTER ONLY

Cylinder Head/Camshafts

Application	Torque(Nm)	Notes
Camshaft cover to cylinder head bolts	10	
Camshaft bearing caps to head bolts	10	Lubricate threads with engine oil. See section 3 for tightening sequence.
Camshaft oil feed pipe to bearing cap bolts	8	
Cam chain tensioner body to crankcase bolts	9	
Cam chain tensioner centre bolt	20	
Cam chain drive gear shaft retaining bolt	10	Prior to engine number 186916
Cam chain drive gear shaft retaining bolt	28	From engine number 186916
Cylinder head nuts	*	Refer to section 3
Cam chain guide blade to cylinder head bolts	10	
Cam chain tensioner blade to cylinder head nut	10	
Oil cooler feed pipe to cylinder head banjo bolts	30	
Low oil pressure warning light switch (oil feed pipe to cylinder head)	13	Always replace the sealing washer
Spark plug	20	
Exhaust pipe stud	10	

Clutch

Application	Torque(Nm)	Notes
Clutch cover to crankcase bolts	9	America
Clutch cover to crankcase bolts	12	Speedmaster
Gearchange lever clamp bolt	9	
Clutch centre nut	105	
Clutch release plate to pressure plate bolts	9	
Clutch lever mounting clamp bolts	15	Tighten upper bolt first then lower bolt
Starter (sprag) clutch housing to crankshaft bolts	16	Fit new bolts if removed
Centrifugal breather to crankshaft screws	12	Fit new screws if removed

Engine mountings

Application	Torque(Nm)	Notes
Front and rear upper mounting bolts	80	
Frame-downtube to frame bolts	55	
Cylinder head to frame mounting bracket bolts Frame bolt Cylinder head bolt	 80 80	

Crankshaft/Connecting Rods

Application	Torque(Nm)	Notes
Crankcase bolts	*	Refer to section 6
Connecting rod big end bolt nuts	*	Refer to section 6
Centrifugal breather to crankshaft screws	12	Fit new screws if removed
Starter (sprag) clutch housing to crankshaft bolts	16	Fit new bolts if removed
Balancer shaft lock washer to crankcase screw	12	Fit a new screw if removed

Transmission

Application	Torque(Nm)	Notes
Gearchange mechanism cover bolts	9	
Selector fork shaft retaining plate screw	12	Fit a new screw if removed
Selector drum cam retaining bolt	12	Fit a new bolt if removed
Gearchange shaft abutment bolt	23	
Detent arm retaining bolt	12	Fit a new bolt if removed
Neutral switch	10	
Sprocket cover to crankcase	9	
Chainguard to swinging arm	7	

Lubrication System

Application	Torque(Nm)	Notes
Sump drain plug	25	
Oil filter	10	
Oil filter adaptor to crankcase	10	Apply Three Bond TB1305 to threads
Low oil pressure warning light switch	13	
Oil cooler mounting bolts	9	
Oil feed pipe to cylinder head banjo bolts (M14 bolts, upper pipe)	30	
Oil feed pipe to oil cooler banjo bolt (M18 bolt, upper pipe)	45	
Oil return pipe to sump banjo bolt to cooler (M18 bolt, lower pipe)	45	
Oil return pipe union to sump adapter	15	
Oil return pipe union sump adapter	45	
Oil pick-up strainer screws	6	Apply Three Bond TB1360 to threads
Sump to crankcase bolts	12	
Oil pump to crankcase bolts	12	
Oil pressure relief valve	15	Apply Three Bond TB1305 to threads

Fuel System/Exhaust

Application	Torque(Nm)	Notes
Fuel tank mounting bolt	19	
Warning light plinth to tank	5	
Airbox mounting bolts	5	
Secondary air injection system control valve to frame screws	8	
Exhaust header pipe to cylinder head nuts	19	
Exhaust header pipe mounting bolts	22	
Exhaust header balance pipe clamp	22	
Silencer mounting (passenger footrest) fixing	See rear suspension	
Silencer clamp	22	
Fuel tank badge to tank	4.5	

Braking System

Application	Torque(Nm)	Notes
Brake caliper bleed nipple	5	
Front brake caliper mounting bolts	28	
Front brake caliper pad retaining pin	18	
Front brake caliper pad retaining pin plug	3	
Front brake hose banjo bolts	25	
Front brake master cylinder mounting clamp bolts	15	Tighten upper bolt first then lower bolt
Front brake disc bolts	22	Fit new bolts if removed
Rear brake fluid reservoir mounting screw	7	
Rear brake caliper mounting bolts	40	
Rear brake caliper pad retaining pins	18	
Rear brake hose to caliper banjo bolt	25	
Rear brake pipe to master cylinder and joint block (steel pipe)	25	
Rear brake master cylinder mounting bolts	27	
Rear brake master cylinder pushrod clevis locknuts	18	
Rear brake light switch	15	
Rear brake disc retaining bolts	22	Fit new bolts if removed
Rear brake hose clamp to swinging arm	7	
Rear brake pedal pivot	30	

Front Suspension/Steering

Application	Torque(Nm)	Notes
Top yoke fork clamp bolt	20	
Bottom yoke fork clamp bolt	45	
Fork top cap	23	
Fork damper rod bolt	43	
Handlebar clamp bolts	26	Tighten front bolts first then rear bolts
Handlebar end weight screw	5	
Fork cover to bottom yoke	9	
Steering head bearing adjuster nut locknut	40	
Steering stem top nut	65	
Handlebar mounting clamp to top yoke nut	45	

Rear Suspension

Application	Torque(Nm)	Notes
Rear suspension unit mounting bolts	28	See text
Swinging arm spindle nut	110	
Swinging arm outrigger clamp bolts	45	

Footrests

Application	Torque(Nm)	Notes
Rider footrest mounting bar to frame	30	
Rider footrest clevis bracket to mounting bar	45	
Rider footrest bracket locating bolt (left hand side only)	9	
Passenger footrest/silencer mounting plate to frame	30	
Passenger footrest to silencer mounting plate	27	

Frame/Bodywork

Application	Torque(Nm)	Notes
Front seat to mudguard fixing	26	
Rear seat to mudguard fixing	10	
Front mudguard to bracket bolts	3	
Front mudguard bracket to fork bolts	12	
Rear mudguard to bracket screws	26	
Rear mudguard to frame cross-beam screws	26	
Rear mudguard bracket to frame screws	64	
Side stand pivot bolt	20	
Side stand pivot bolt locknut	25	
Airbox cover/airbox wiring cover	3	

Wheels

Application	Torque(Nm)	Notes
Front wheel spindle fixing	60	
Front wheel spindle clamp bolt	20	
Rear wheel spindle nut	85	

Final Drive

Application	Torque(Nm)	Notes
Rear wheel spindle nut	85	
Chainguard to swinging arm screws	7	
Front sprocket cover bolts	9	
Front sprocket nut	132	Secure in position with lockwasher
Rear sprocket nuts	85	

Electrical System/Ignition

Application	Torque(Nm)	Notes
Headlight mounting bracket to lower yoke	27	
Headlight clamp to bracket	27	
Speedometer bracket to top yoke	9	
Rear light fixings	3	
Rear light bracket to mudguard	5	
Front indicator to bracket	15	
Front indicator bracket to hand controls	15	
Rear indicator mounting nuts	18	
Handlebar switch retaining screws	2	
Ignition switch screws	5	
Alternator rotor bolt M10 bolt M12 bolt	 98 120	
Alternator stator to cover bolts	12	
Alternator stator wiring clamp to cover screw	12	
Alternator cover to crankcase bolts	9	
Regulator/rectifier fixings	9	
Starter motor to crankcase bolts	10	
Starter motor lead terminal nut	7	
Starter solenoid lead terminal nut	7	
Ignition pick-up coil screws	10	Ensure coil air gap is correctly set
Igniter unit retaining nut	9	

TORQUE WRENCH SETTINGS - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

Cylinder Head/Camshafts

Application	Torque(Nm)	Notes
Camshaft cover to cylinder head bolts	10	
Camshaft bearing caps to head bolts	10	Lubricate threads with engine oil. See section 3 for tightening sequence.
Camshaft oil feed pipe to bearing cap bolts	8	
Cam chain tensioner body to crankcase bolts	9	
Cam chain tensioner centre bolt	20	
Cam chain drive gear shaft retaining bolt	10	Prior to engine number 186916
Cam chain drive gear shaft retaining bolt	28	From engine number 186916
Cylinder head nuts	*	Refer to section 3
Cam chain guide blade to cylinder head bolts	10	
Cam chain tensioner blade to cylinder head nut	10	
Oil cooler feed pipe to cylinder head banjo bolts	30	
Low oil pressure warning light switch (oil feed pipe to cylinder head)	13	Always replace the sealing washer
Spark plug	20	
Exhaust pipe stud	10	

Clutch

Application	Torque(Nm)	Notes
Clutch cover to crankcase bolts	9	
Gearchange lever clamp bolt	9	
Clutch centre nut	105	
Clutch release plate to pressure plate bolts	9	
Clutch lever mounting clamp bolts	15	Tighten upper bolt first then lower bolt
Starter (sprag) clutch housing to crankshaft bolts	16	Fit new bolts if removed
Centrifugal breather to crankshaft screws (up to engine number 221606)	12	Fit new screws if removed

Engine mountings

Application	Torque(Nm)	Notes
Front and rear upper mounting bolts	80	
Frame-downtube to frame bolts	55	
Frame-tube brace bolts	22	
Cylinder head to frame mounting bracket bolts Frame bolt Cylinder head bolt	 27 80	

Crankshaft/Connecting Rods

Application	Torque(Nm)	Notes
Crankcase bolts	*	Refer to section 6
Connecting rod big end bolt nuts	*	Refer to section 6
Balancer shaft lock washer to crankcase screw	12	Fit a new screw if removed

Transmission

Application	Torque(Nm)	Notes
Gearchange mechanism cover bolts	9	Except Scrambler
Gearchange mechanism cover bolts	12	Scrambler
Selector fork shaft retaining plate screw	12	Fit a new screw if removed
Selector drum cam retaining bolt	12	Fit a new bolt if removed
Gearchange shaft abutment bolt	23	
Detent arm retaining bolt	12	Fit a new bolt if removed
Neutral switch	10	
Sprocket cover to crankcase	9	
Chainguard to swinging arm	7	

Lubrication System

Application	Torque(Nm)	Notes
Sump drain plug	25	
Oil filter	10	
Oil filter adaptor to crankcase	10	Apply Three Bond TB1305 to threads
Low oil pressure warning light switch	13	
Oil cooler mounting bolts	9	
Oil feed pipe to cylinder head banjo bolts (M14 bolts, upper pipe)	30	
Oil feed pipe to oil cooler banjo bolt (M18 bolt, upper pipe)	45	
Oil return pipe to sump banjo bolt to cooler (M18 bolt, lower pipe)	45	
Oil return pipe union to sump adapter	15	
Oil return pipe union sump adapter	45	
Oil pick-up strainer screws	6	Apply Three Bond TB1360 to threads
Sump to crankcase bolts	12	
Oil pump to crankcase bolts	12	
Oil pressure relief valve	15	Apply Three Bond TB1305 to threads

Fuel System/Exhaust

Application	Torque(Nm)	Notes
Fuel tank mounting bolts	9	
Airbox mounting bolts	6	
Secondary air injection system control valve to frame screws	8	
Exhaust header pipe to cylinder head nuts	19	
Exhaust header pipe mounting bolts	22	Except Scrambler
Exhaust header pipe mounting bolts	19	Scrambler
Exhaust header balance pipe clamp	22	Except Scrambler
Silencer mounting (passenger footrest) nut	27	Except Scrambler
Silencer mounting plate to frame	10	Scrambler
Silencer clamp	22	
Fuel tank badge to tank	4.5	

Braking System

Application	Torque(Nm)	Notes
Brake caliper bleed nipple	5	
Front brake caliper mounting bolts	28	
Front brake caliper pad retaining pin	18	
Front brake caliper pad retaining pin plug	3	
Front brake hose banjo bolts	25	
Front brake master cylinder mounting clamp bolts	15	Tighten upper bolt first then lower bolt
Front brake disc bolts	22	Fit new bolts if removed
Rear brake fluid reservoir mounting screw	5	Except Scrambler
Rear brake fluid reservoir mounting screw	7	Scrambler
Rear brake caliper mounting bolts	40	
Rear brake caliper pad retaining pins	18	
Rear brake hose to caliper banjo bolt	25	
Rear brake master cylinder mounting bolts	27	Except Scrambler
Rear brake master cylinder mounting bolts	18	Scrambler
Rear brake master cylinder pushrod clevis locknuts	18	
Rear brake light switch	15	Except Scrambler
Rear brake disc retaining bolts	22	Fit new bolts if removed
Rear brake hose clamp to swinging arm	7	
Rear brake pedal pivot	22	Thruxton
Rear brake pedal pivot	27	Bonneville/ T100/Scrambler

Front Suspension/Steering

Application	Torque(Nm)	Notes
Top yoke fork clamp bolt	27	
Bottom yoke fork clamp bolt	27	
Fork top cap	23	
Fork damper rod bolt	30	
Handlebar clamp bolts	26	Bonneville/ T100/Scrambler Tighten front bolts first then rear bolts
Handlebar pinch bolts	27	Thruxton
Handlebar end weight screw	5	
Steering head bearing adjuster nut locknut	40	
Steering stem top nut	65	Bonneville/ T100/Scrambler
Steering stem top nut	90	Thruxton only
Handlebar mounting clamp to top yoke nut	35	

Rear Suspension

Application	Torque(Nm)	Notes
Rear suspension unit mounting bolts	28	See text
Swinging arm spindle nut	110	

Footrests

Application	Torque(Nm)	Notes
Rider footrest bracket to frame bolts	27	

Frame/Bodywork

Application	Torque(Nm)	Notes
Seat to frame screws	10	
Front mudguard to stay bolts	9	Bonneville/T100
Front mudguard stay to fork bolts	12	Bonneville/T100
Front mudguard to bracket bolts	3	Thruxton/Scrambler
Front mudguard bracket to fork bolts	24	
Rear mudguard mounting screws	9	
Side stand pivot bolt	20	
Side stand pivot bolt locknut	25	

Wheels

Application	Torque(Nm)	Notes
Front wheel spindle fixing	60	
Front wheel spindle clamp bolt	27	
Rear wheel spindle nut	85	

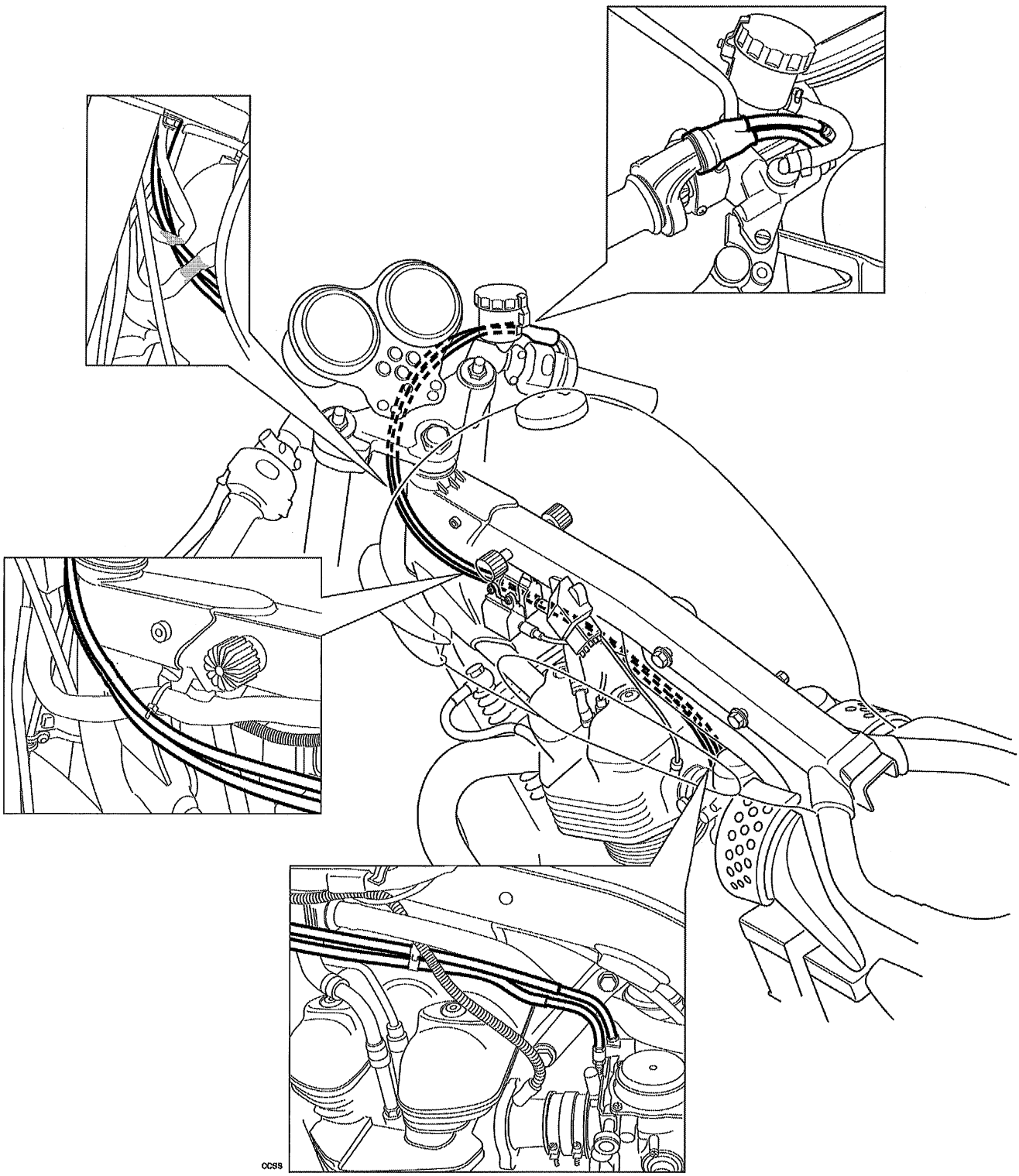
Final Drive

Application	Torque(Nm)	Notes
Chainguard to swinging arm screws	7	
Front sprocket cover bolts	9	
Front sprocket nut	132	Use lockwasher
Rear sprocket nuts	55	

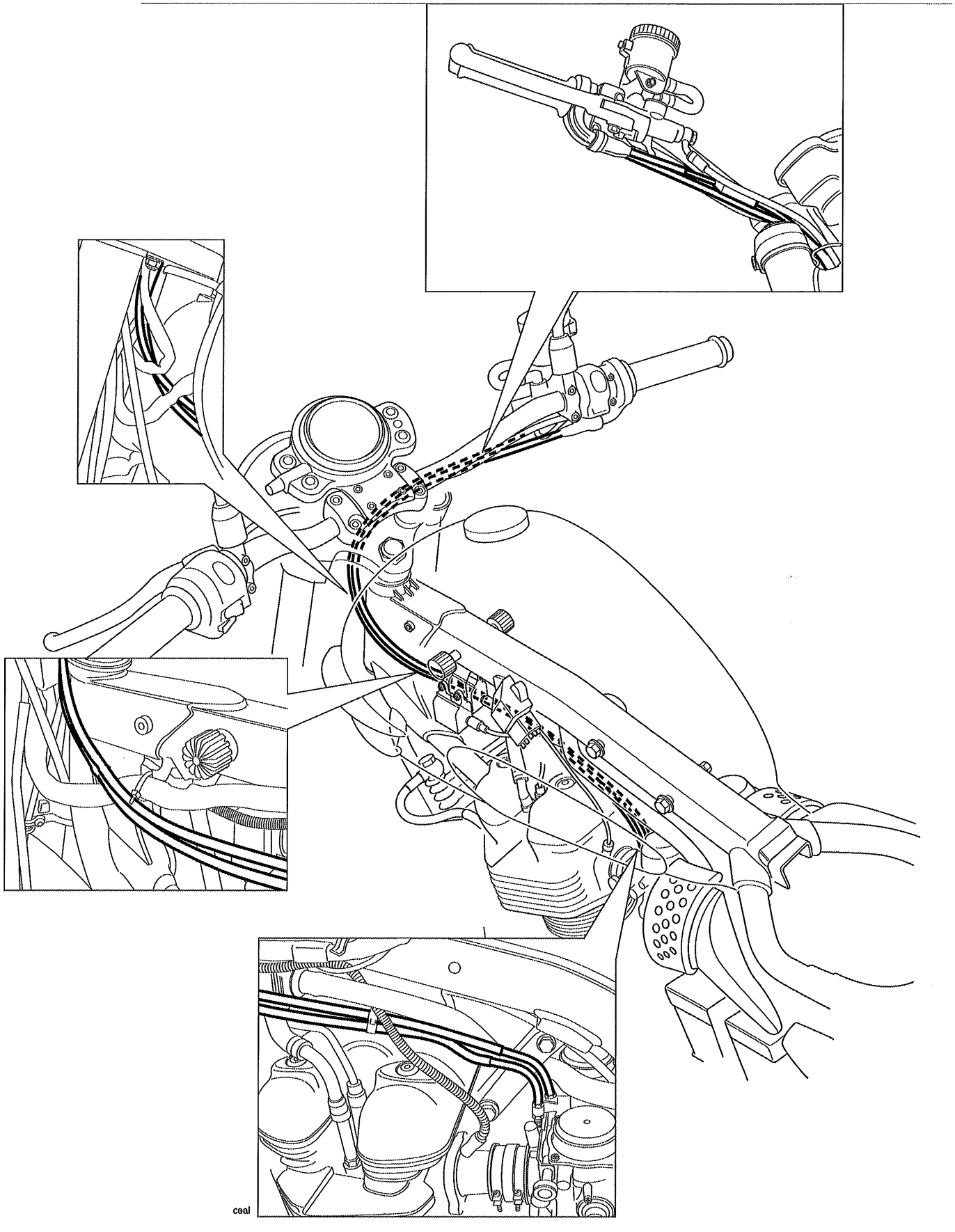
Electrical System/Ignition

Application	Torque(Nm)	Notes
Headlight mounting bolts	10	
Speedometer housing to top yoke bolts	9	
Rear light fixings	9	
Front indicator mounting nuts	10	
Rear indicator mounting nuts	18	
Handlebar switch retaining screws	2	
Ignition switch screws	5	
Alternator rotor bolt M10 bolt M12 bolt	 98 120	
Alternator stator to cover bolts	12	
Alternator stator wiring clamp to cover screw	7	
Alternator cover to crankcase bolts	9	
Regulator/rectifier fixings	9	
Starter motor to crankcase bolts	10	
Starter motor lead terminal nut	7	
Starter solenoid lead terminal nut	7	
Ignition pick-up coil screws	10	Ensure coil air gap is correctly set
Igniter unit retaining nut	9	

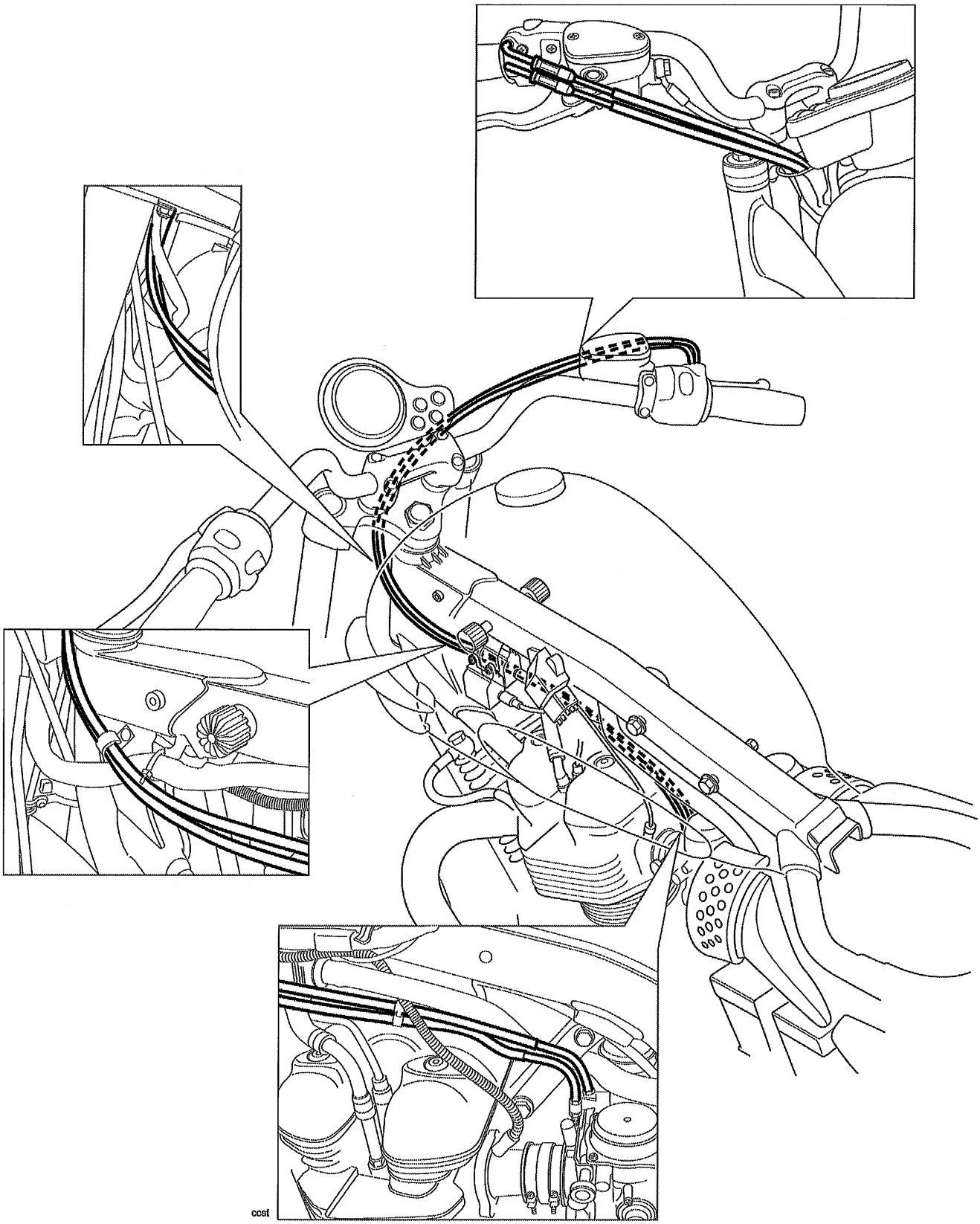
Throttle Cable Routing - Thruxton



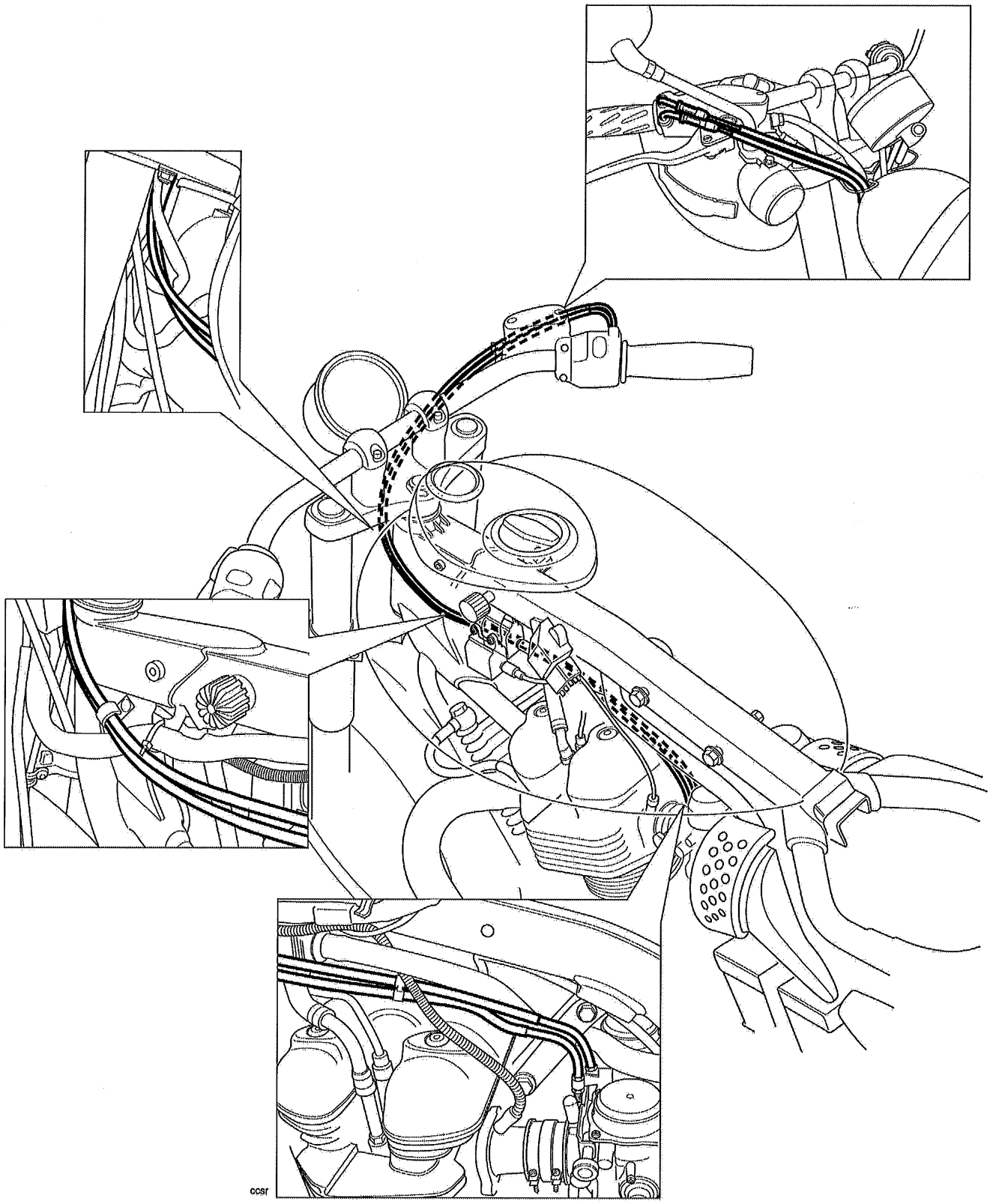
Throttle Cable Routing - Scrambler



Throttle Cable Routing - Bonneville/Bonneville T100



Throttle Cable Routing - America & Speedmaster



MAINTENANCE

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INTRODUCTION

This maintenance schedule given below describes the maintenance requirements for the **Bonneville, Bonneville T100, Speedmaster, America, Scrambler** and **Thruxton** models.

WARNING: The importance of good maintenance cannot be overestimated. The tasks described will help to ensure the safe and reliable operation of your Triumph motorcycle. Never attempt to cut costs by neglecting the maintenance requirements of your machine as this will result in the premature failure of the component(s) concerned and may lead to an unsafe riding condition and an accident.

Scheduled Maintenance Chart

Scheduled Maintenance Chart						
Operation Description	**Odometer Reading in Miles (Kms) or time period, whichever comes first.**					
	Every	500 (800) 1 month	6000 (10000) 1 year	12000 (20000) 2 years	18000 (30000) 3 years	24000 (40000) 4 years
Engine/oil cooler - check for leaks	Day	●	●	●	●	●
Engine oil - renew	-	●	●	●	●	●
Engine oil filter - renew	-	●	●	●	●	●
Valve clearances - check/adjust	-			●		●
Air cleaner - renew	-			●		●
Spark plugs - check	-		●		●	
Spark plugs - renew	-			●		●
Carburettors - balance	-			●	●	●
Idle CO level - check and adjust	-	●	●	●	●	●
Fuel system - check for leaks, chafing etc.	Day	●	●	●	●	●
Throttle cables - check/adjust	Day	●	●	●	●	●
Lights, instruments & electrical systems - check	Day	●	●	●	●	●
Steering - check for free operation	Day	●	●	●	●	●
Steering head bearings - check/adjust	-	●	●	●	●	●
Steering head bearings - lubricate	-			●		●
Forks - check for leaks/smooth operation	Day	●	●	●	●	●
Fork oil - renew	-					●
Brake fluid levels - check	Day	●	●	●	●	●
Brake calipers - check for leaks/seized pistons	-	●	●	●	●	●
Brake master cylinders - check for leaks	-	●	●	●	●	●
Brake fluid - renew	Every 2 years					
Brake light - check operation	Day	●	●	●	●	●
Brake pads wear - check	Day	●	●	●	●	●
Drive chain - lubricate	Every 200 miles (300 kms)					
Drive chain - wear check	Every 500 miles (800 kms)					

Scheduled Maintenance Chart (continued)						
Operation Description	**Odometer Reading in Miles (Kms) or time period, whichever comes first.**					
	Every	500 (800) 1 month	6000 (10000) 1 year	12000 (20000) 2 years	18000 (30000) 3 years	24000 (40000) 4 years
Drive chain slack - check/adjust	Day	●	●	●	●	●
Fasteners - inspect visually for security	Day	●	●	●	●	●
Wheels - inspect for damage	Day	●	●	●	●	●
Tyre wear/tyre damage - check	Day	●	●	●	●	●
Tyre pressures - check/adjust	Day	●	●	●	●	●
Clutch cable - check/adjust	Day	●	●	●	●	●
Fuel and evaporative* hoses - renew	-					●
Secondary air injection system - clean	-			●		●

*Evaporative hoses on California models only.

CYLINDER HEAD & CAMSHAFT

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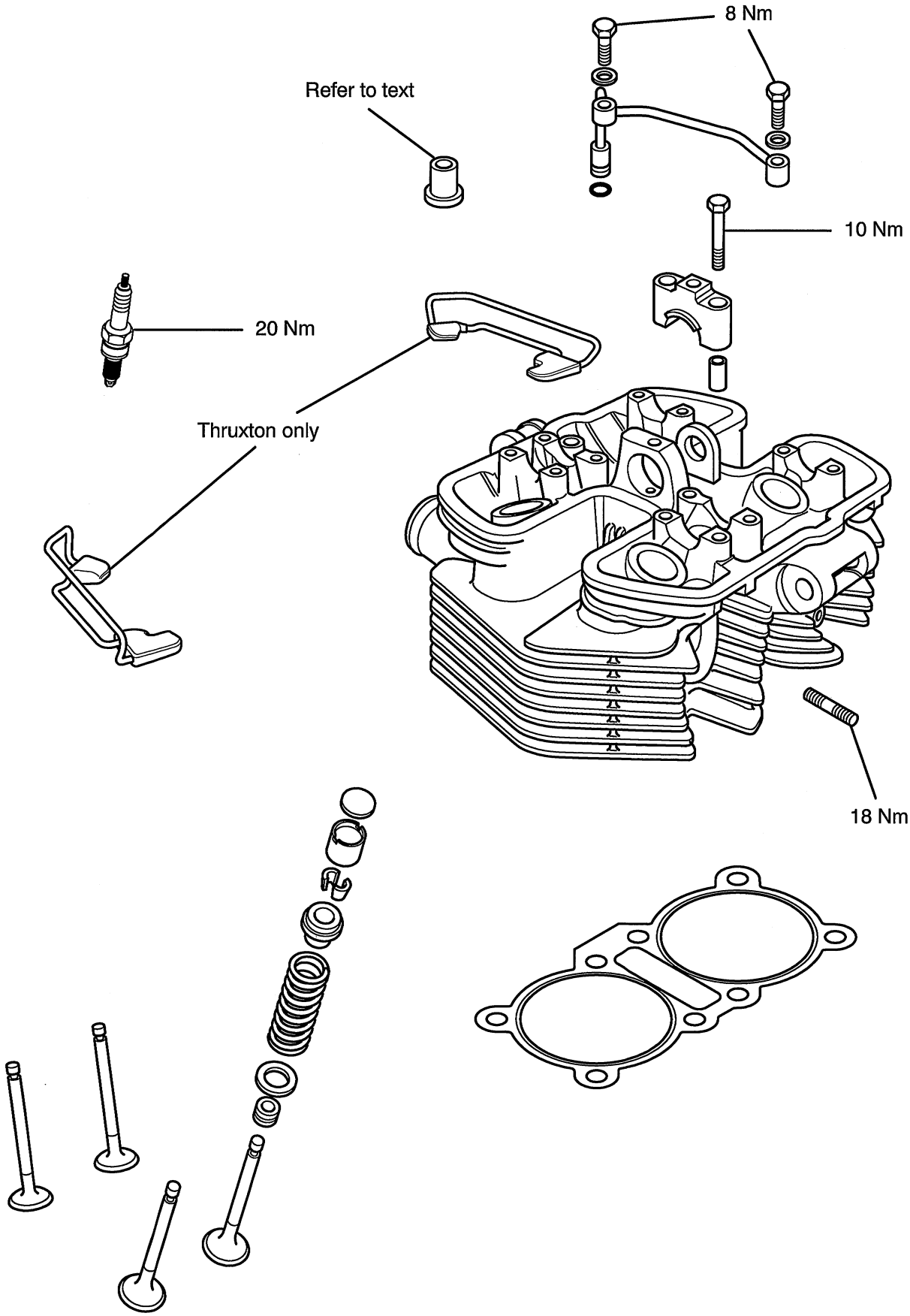
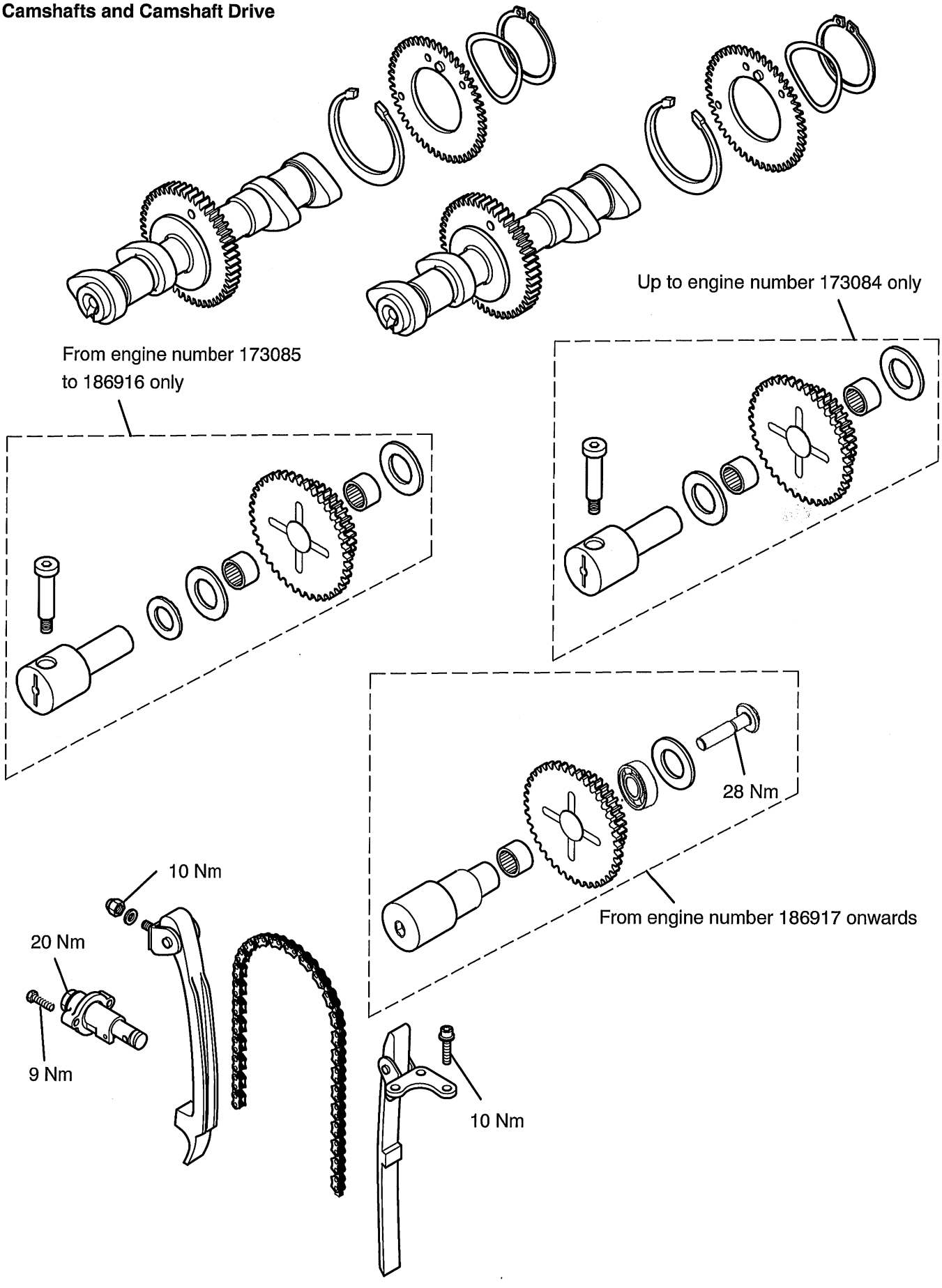
Exploded View
Cylinder Head and Valves



Exploded View
Camshafts and Camshaft Drive



GENERAL DESCRIPTION

The engine is fitted with an aluminum alloy cylinder head which carries the camshafts, camshaft drive gear, valves and spark plugs.

The camshafts run directly in the cylinder head without additional bearings and are driven by the drive gear. The drive gear runs on needle roller bearings and is chain-driven off the crankshaft. The cam chain is tensioned by a self-adjusting, spring-loaded tensioner which is fitted to the upper crankcase half.

The inlet and exhaust valves are fitted with single springs. Valve clearances are adjusted by changing variable thickness shims which sit between the cam lobe and tappet bucket.

Both the tip and seating face of the valves are hardened to give a long service life. Due to methods used in assembly, the valve seats and valve guides cannot be replaced.

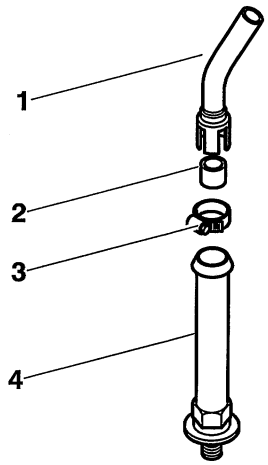
CAMSHAFT COVER

Removal

If the engine is in the frame carry out the following:

- Remove seat.
- Disconnect battery, disconnecting negative (-) terminal first.
- Remove fuel tank and secondary air injection system control valve (see fuel system & exhaust section).

1. Release the clips and remove the secondary air injection pipes and seals from the cylinder head adaptors.



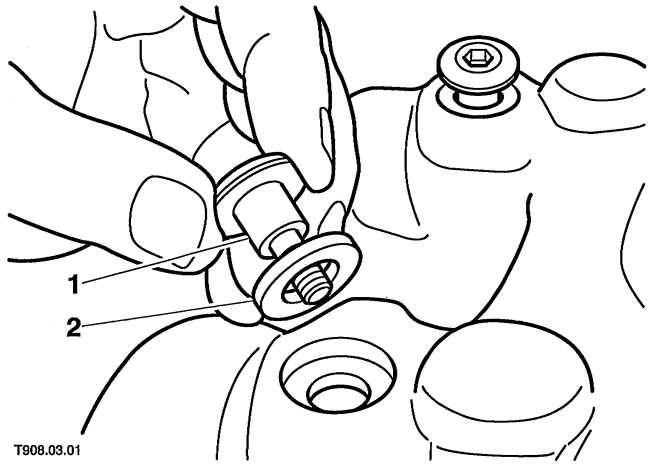
1. Pipe

2. Seal

3. Clip

4. Adaptor

2. Evenly and progressively release the bolts securing the camshaft cover to the cylinder head. Recover the bolts and seals from the cover.



1. Camshaft cover bolt

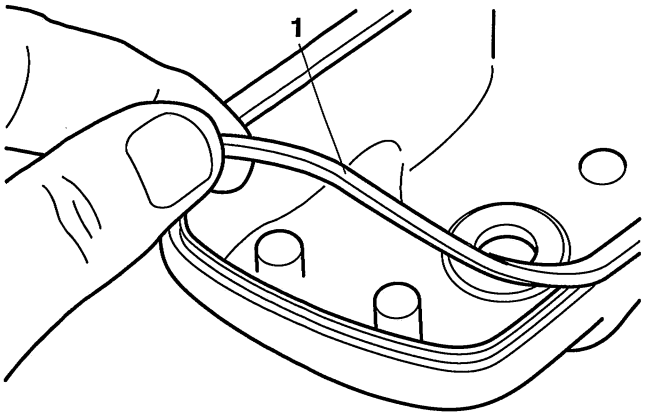
2. Seal

3. Remove the camshaft cover and seal from the cylinder head.

Installation

1. Check the condition of the camshaft cover seal and cover bolt seals. Renew any seal which shows signs of damage.

2. Ensure the cover seal groove and cylinder head mating surfaces are clean and dry then fit the seal to the cover.



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1. Camshaft cover seal

3. Fit the camshaft cover to the cylinder head ensuring the seal remains correctly seated in its groove.

4. Fit the cover bolt seals with their steel sides upwards then fit the cover bolts.

5. Tighten all camshaft cover bolts finger tight then progressively tighten them to **10 Nm**.

6. Seat the secondary air injection pipes and seals back on the cylinder head adaptors and secure in position with the retaining clips.

7. Refit all components removed for access.

CAMSHAFTS

Removal

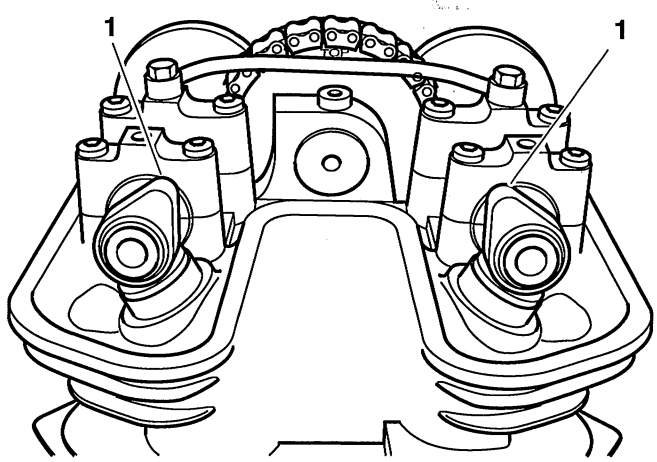
NOTE:

- **The camshafts can be removed from the cylinder head without disturbing the cam chain.**
- **Service tool kit T3880330 (consisting of a wrench and two locking pins) will be needed to remove/install the camshafts.**

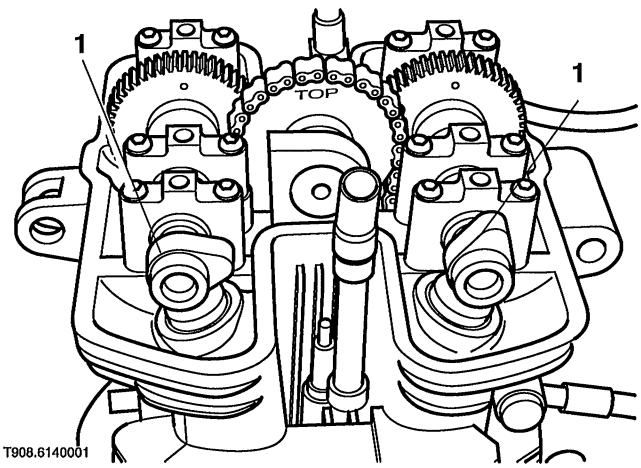
1. Remove the camshaft cover.

2. Remove the alternator cover from the right-hand side of the crankcase (see alternator removal in electrical & ignition system section).

3. Using a socket on the alternator rotor bolt, rotate the crankshaft clockwise until the camshaft lobes of the right-hand cylinder are positioned as shown and the TOP mark on the camshaft drive gear is uppermost.



1. Right-hand cylinder camshaft lobe positions - BONNEVILLE, BONNEVILLE T100 & THRUXTON - 360° firing angle.



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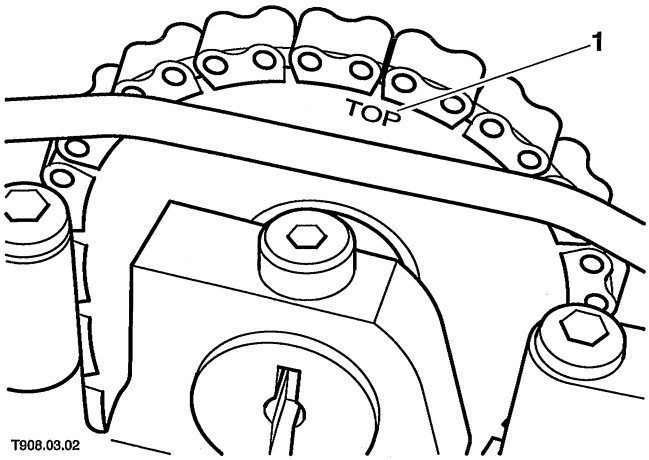
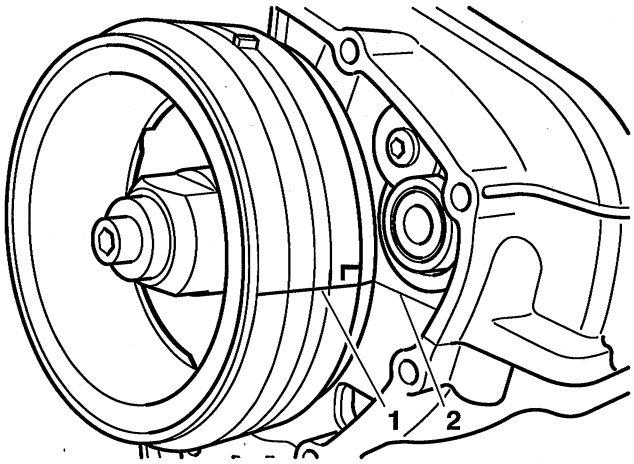
1. Right-hand cylinder camshaft lobe positions - AMERICA, SCRAMBLER and SPEEDMASTER - 270° firing angle.



1. Camshaft drive gear TOP mark

4. On America, Scrambler & Speedmaster, the alternator rotor has two lines, marked 'L' & 'R'. Align the line marked 'L' on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.

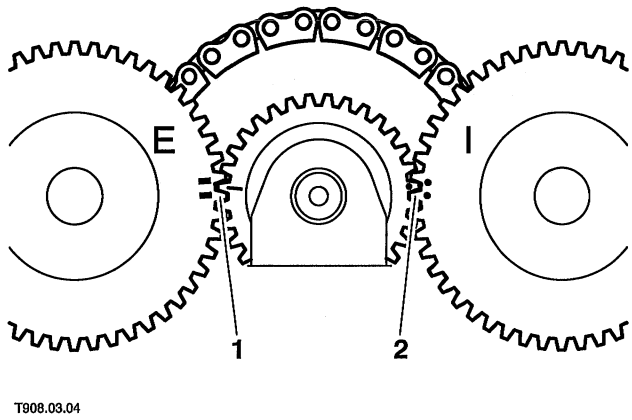


1. Alternator 'L' line (America/Speedmaster shown)

2. Crankcase joint

5. On Bonneville, Bonneville T100 & Thruxton, the alternator rotor has one line and is not marked with a letter. Align the line marked on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.

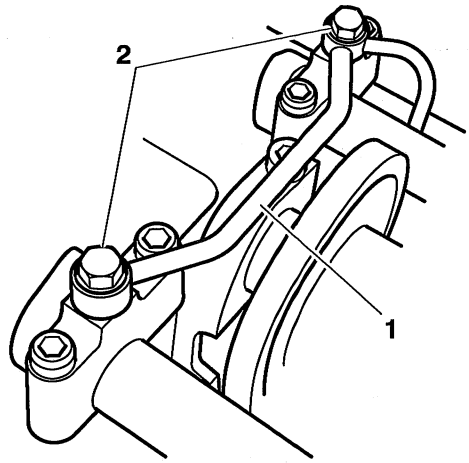
6. Check the position of the timing marks on the left-hand side of the camshaft gears and drive gear. The drive gear line should be positioned between the two lines on the exhaust camshaft gear and its dot should be positioned between the two dots on the inlet camshaft gear.



1. Exhaust camshaft timing marks

2. Inlet camshaft timing marks

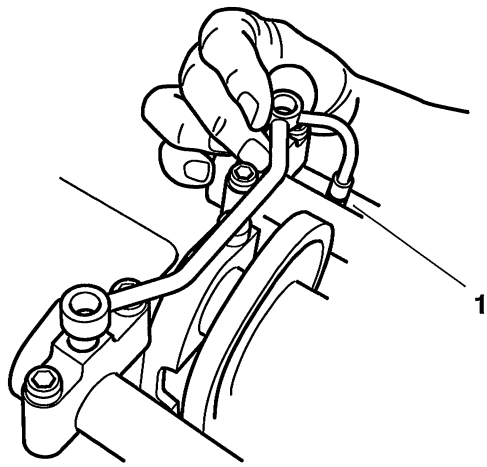
7. Unscrew the banjo bolts securing the oil pipe to the top of the camshaft bearing caps. Recover the sealing washer from each bolt and discard them.



1. Oil pipe

2. Banjo bolts

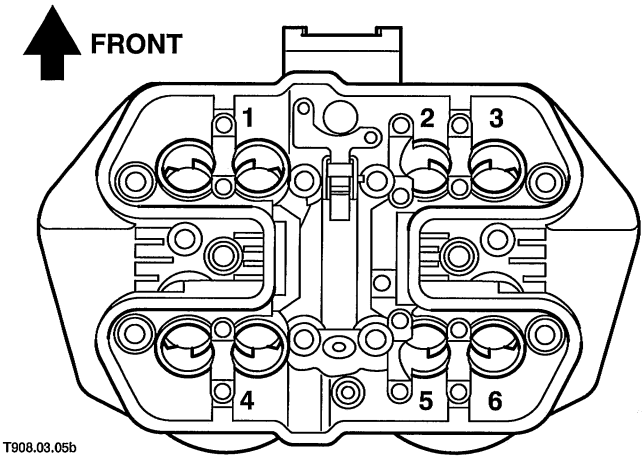
8. Ease out the oil feed pipe along with its O-ring.



1. Oil pipe O-ring

9. Insert a locking pin from tool T3880330 into the camshaft gear to secure the backlash gear in position.

10. Note the identification marks on the camshaft caps and head. They are numbered 1 to 6 and each cap should have an arrow on it to indicated its correct fitted orientation. If the marks are not clearly visible, mark each cap with a marker pen to ensure they are refitted in their original locations.



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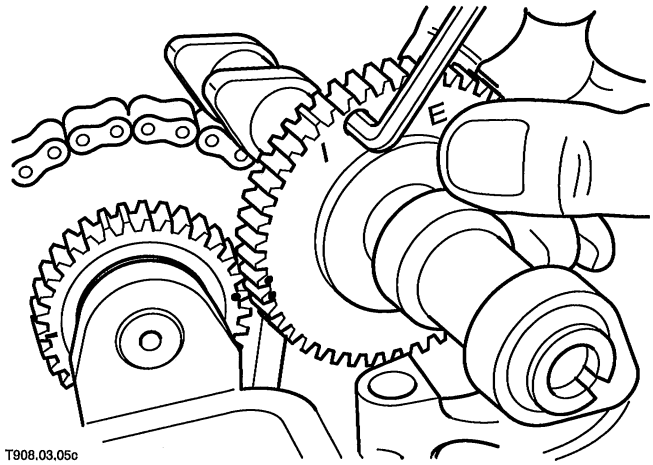
Cylinder head/camshaft cap markings

11. Evenly and progressively slacken the camshaft cap bolts by half-a-turn at a time until valve spring pressure is released from the caps.

CAUTION: Ensure all camshaft caps are released evenly and squarely from the cylinder head and do not stick on the locating dowels. Failure to do so could result in damage to one or more of the caps. The camshafts caps are only available as part of the cylinder head assembly and cannot be supplied separately.

12. Remove the bolts and lift off the camshaft caps, taking care not to lose the locating dowels.

13. Lift the camshaft out of position.



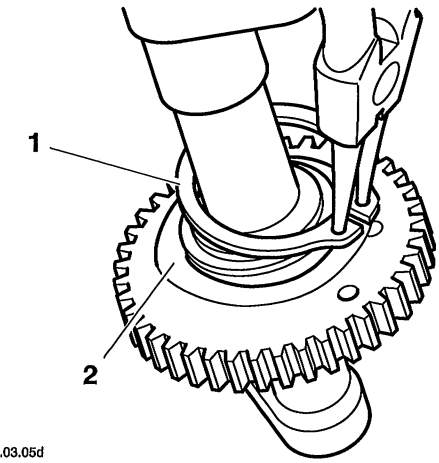
T908.03.05c

Removing the inlet camshaft

NOTE:

- **The inlet and exhaust camshafts are different and are not interchangeable (see installation).**

14. If the backlash gear is to be removed, remove the locking pin from the camshaft gear to release the spring tension. Remove the circlip and remove the spring washer, backlash gear and spring from the camshaft.



T908.03.05d

1. Circlip

2. Spring washer

Inspection

1. Inspect the camshaft gears for damaged and/or worn teeth. Replace as necessary.

2. Check the diameter of the camshaft journals. If any journal diameter exceeds the specified limits, the camshaft must be renewed.

Camshaft journal diameter

Standard	**22.930 to 22.960 mm**

3. Inspect the camshaft bearing surfaces in the cylinder head and the camshaft caps for wear and/or damage. If wear and/or damage is found renew the cylinder head assembly.

4. Check each camshaft journal to camshaft cap clearance using Plastigauge (Triumph part number 3880150-T0301) as follows:

   a. Place the camshaft in the cylinder head (in its correct position). Ensure that the camshaft gear timing marks are correctly positioned as for removal.

   b. Ensure all the locating dowels are in position then fit the camshaft caps in their correct locations

   c. Lubricate the threads of the camshaft cap bolts with a drop of clean engine oil then fit the bolts.

   d. Evenly and progressively tighten the bolts to draw the camshaft caps evenly and squarely down onto the cylinder head. Once all the caps are in contact with the head, go around and tighten the bolts to **10 Nm.**

CAUTION: Ensure the camshaft caps are drawn evenly and squarely down onto the cylinder head and do not stick on the locating dowels. Failure to do so could result in damage to one or more of the caps. The camshafts caps are only available as part of the cylinder head assembly and cannot be supplied separately.

   e. Unscrew the bolts from one camshaft cap and remove the cap. Wipe the exposed areas of the camshaft journal and cap.

   f. Apply a thin smear of grease to the exposed part of the camshaft journal and a small quantity of silicone release agent to the camshaft cap.

   g. Size a piece of Plastigauge to fit across the exposed camshaft journal.

   h. Fit the Plastigauge to the exposed camshaft journal using the grease to hold it in place.

   i. Refit the camshaft cap and progressively tighten its bolts to **10 Nm.**

   j. Unscrew the bolts and remove the camshaft cap.

   k. Using the gauge provided with the Plastigauge kit, measure the width of the now compressed Plastigauge and obtain the journal clearance.

1. Compressed Plastigauge

   l. Once the clearance has been measured, refit the cap. Progressively tighten the cap bolts to **10 Nm** then repeat the check on the remaining camshaft bearings.

5. If any of the clearances measured exceed the specified tolerance, the cylinder head assembly must be replaced.

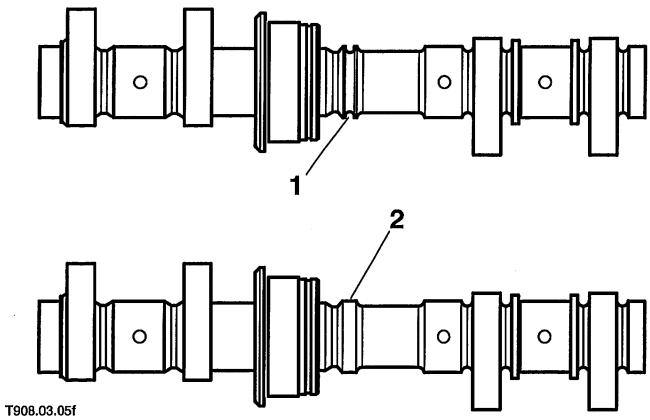
Camshaft bearing journal clearance

Standard	**0.040 – 0.091 mm**
Service limit:	**0.12 mm**

Installation

NOTE:

- **The inlet and exhaust camshafts are different and are not interchangeable. The inlet camshaft has a groove in its machined surface whereas the exhaust camshaft has no groove.**

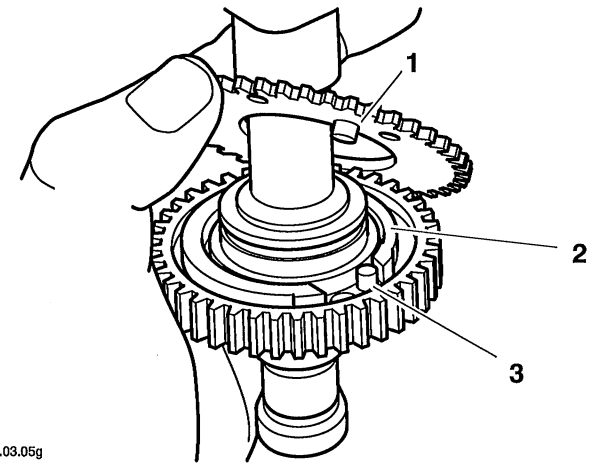


T908.03.05f

1. Inlet camshaft identification groove

2. Exhaust camshaft plain surface

1. If the backlash gear was disassembled, fit the spring to camshaft gear, positioning the spring ends on either side of the peg. Fit the backlash gear, ensuring its peg is located to the right of the camshaft gear peg and between the spring ends. Fit the wave washer and secure all components in position with the circlip.



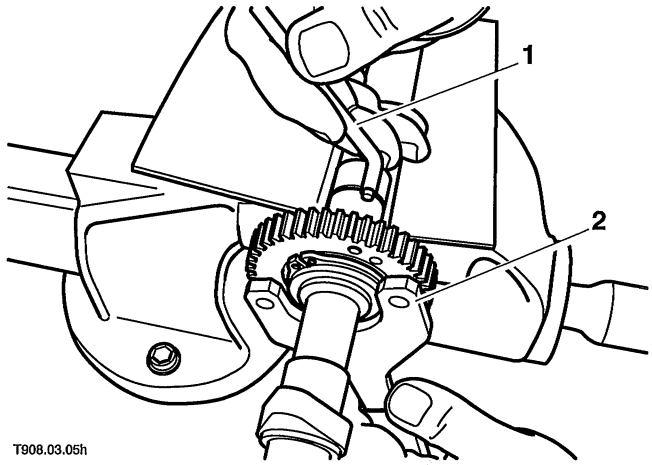
T908.03.05g

1. Backlash gear peg

2. Spring

3. Camshaft gear peg

2. Carefully clamp the camshaft in a vice equipped with soft jaws. Engage the wrench with the backlash gear and rotate the gear clockwise to pretension the spring. Align the holes in the backlash and camshaft gear and insert the locking pin from tool T3880330 to hold it in position.



T908.03.05h

1. Locking pin

2. Wrench

3. Ensure the crankshaft is still positioned at TDC (alternator rotor mark facing forwards and aligned with crankcase joint) and the drive gear is correctly positioned with its TOP mark uppermost.

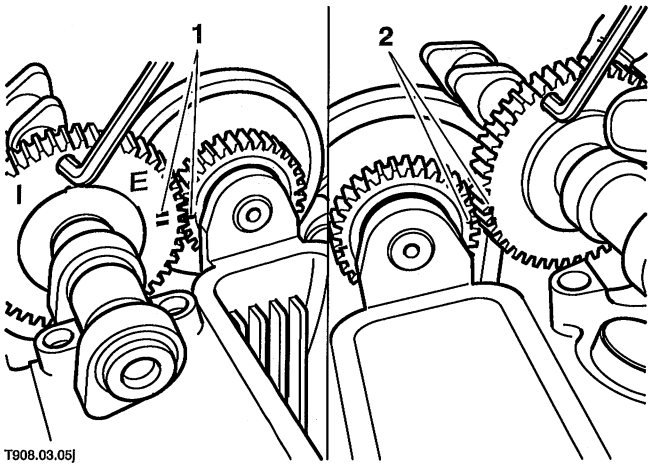
4. Ensure all the tappet buckets and shims are correctly fitted.

5. Thoroughly clean the camshafts, bearing caps and cylinder head bearings. Lubricate the bearing and lobe areas with clean engine oil. Each camshaft is installed individually as follows.

6. With the backlash gear correctly pretensioned and locked in position, engage the camshaft with the drive gear. If the inlet camshaft is being fitted, ensure the two dots on the camshaft gear are positioned on either side of the dot on the drive gear. If the exhaust camshaft is being fitted ensure the two lines on the camshaft gear are positioned on either side of the line on the drive gear.

NOTE:

- **Ensure the timing marks are correctly aligned before proceeding.**

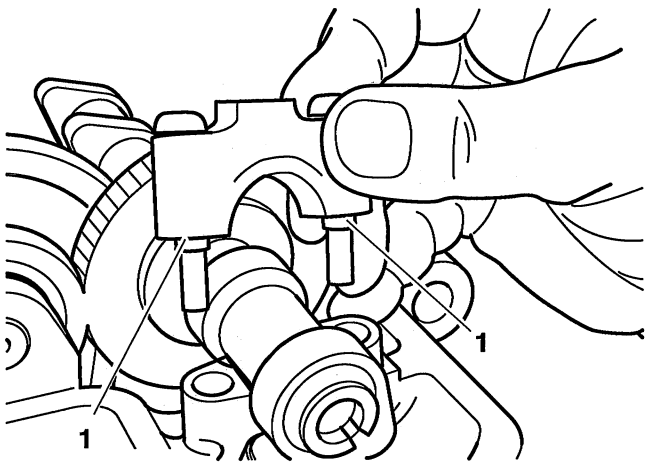


T908.03.05j

1. Exhaust camshaft timing marks

2. Inlet camshaft timing marks

7. Ensure all locating dowels are in position then refit the camshaft caps. Use the marks to ensure each cap is fitted in its original position (cap and cylinder head numbers must match and all the arrows must point forwards).

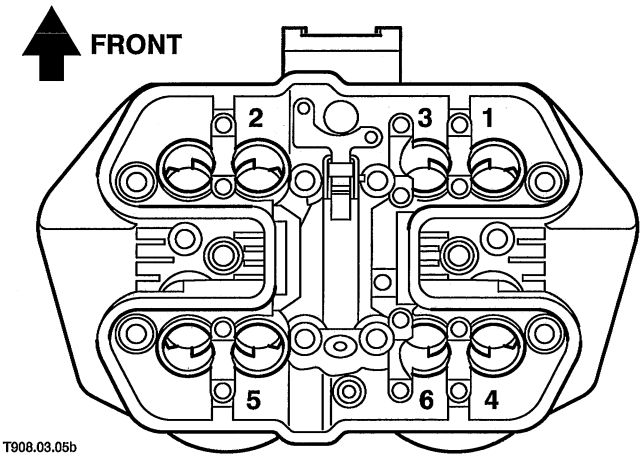


1. Locating dowels

8. Refit the cam cap bolts.

9. Evenly and progressively tighten the bolts to draw the camshaft caps evenly and squarely down onto the cylinder head. Once all the caps are in contact with the head, go around and tighten the bolts to **10 Nm in the sequence shown.**

CAUTION: Ensure the camshaft caps are drawn evenly and squarely down onto the cylinder head and do not stick on the locating dowels. Failure to do so could result in damage to one or more of the caps. The camshafts caps are only available as part of the cylinder head assembly and cannot be supplied separately.



T908.03.05b

Cam cap tightening sequence

10. Once the caps are correctly tightened, remove the service tool to release the backlash gear.

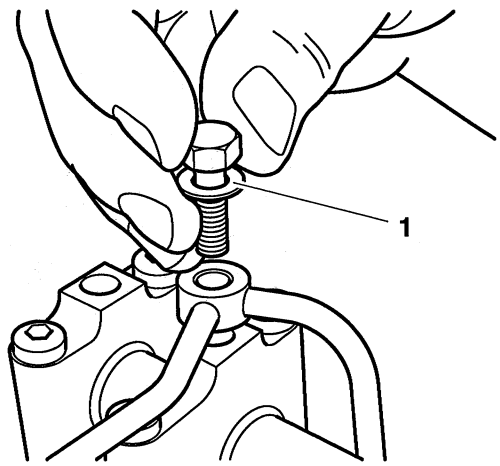
11. Repeat the procedure and install the remaining camshaft.

12. Check that the timing marks are correctly set then check the valve clearances. Adjust as necessary.

13. Fit a **new** O-ring to the end of the oil feed pipe.

14. Lubricate the O-ring with clean engine oil then fit the oil feed pipe to the cylinder head.

15. Fit a **new** sealing washer to each oil feed pipe banjo bolt. Fit the bolts and washers to the pipe and tighten to **8 Nm.**



T908.03.05l

1. Sealing washer

16. Refit the camshaft cover and alternator cover.

VALVE CLEARANCES

Check

Camshaft, valve, shim and valve seat wear affect the valve clearances. The effect of this wear is to change the clearance between the camshaft and the shim, causing engine noise and improper running. If the valve clearances become too small, permanent damage to the valve and valve seat will take place. If the valve clearance becomes too great, the engine will become noisy and will not run efficiently.

NOTE:

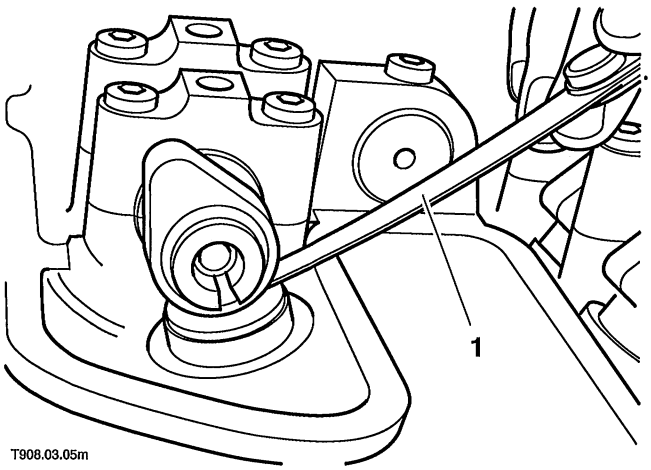
- **Valve clearance adjustment must be carried out with the engine cold.**

1. Remove the camshaft cover.
2. Remove the alternator cover from the right-hand side of the crankcase (see alternator removal in electrical & ignition system section).
3. Using a socket on the alternator rotor bolt, rotate the crankshaft clockwise until a pair of camshaft lobes are pointing directly away from their valves.
4. Using feeler gauges, measure and record the clearances of both valves.

NOTE:

- **The correct valve clearances are in the range given below:**

Inlet	**0.15 – 0.20 mm**
Exhaust	**0.25 – 0.30 mm**



T908.03.05m

1. Feeler gauge

5. Repeat the process until the clearance of all valves have been checked.
6. If any of the measurements taken do not fall within the specified tolerances, adjust the relevant clearance as described in 'adjustment'.
7. Once all clearances are correctly set, refit the camshaft cover and alternator cover.

Adjustment

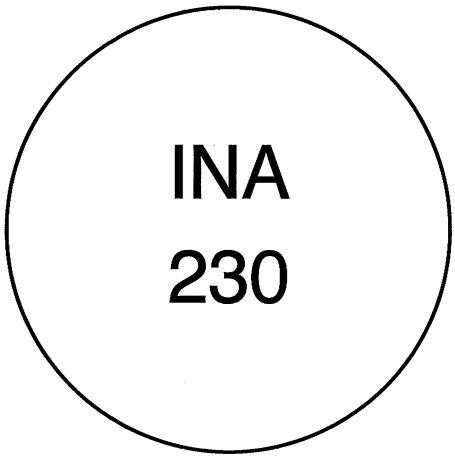
NOTE:

- **The camshaft must be removed to enable the shims to be removed from the tappet buckets.**

1. Remove the camshaft(s) (as necessary).
2. Remove the shim from the top of the tappet bucket.
3. Measure the thickness of the removed shim with a micrometer.

NOTE:

- **The shim thickness is marked on one of the shim faces (this may no longer be visible on used shims).**



T908.03.05n

Shim identification marking (2.30 mm shim shown)

4. Using the measured clearance and the thickness measurement of the original shim, calculate the correct thickness of shim required.

NOTE:

- **If the clearance is too small, a thinner shim will be required, and if the clearance is too large a thicker shim will be required. Shims are available in sizes ranging from 2.00 mm to 3.20 mm in increments of 0.025 mm.**

5. Fit the correct shim to the tappet bucket with its marked face downwards. Ensure the shim is correctly located in the bucket.
6. Repeat the adjustment procedure on all other valves requiring adjustment then refit the camshaft(s).
7. Once adjustment is complete, rotate the crankshaft through a couple of rotations to settle all shims in position then recheck the valve clearances.

CAM CHAIN TENSIONER

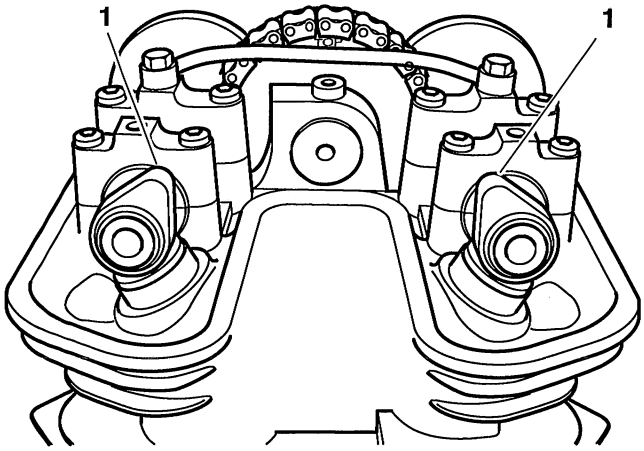
Removal

CAUTION: Never rotate the crankshaft whilst the cam chain tensioner is removed. If the tensioner is not fitted, the cam chain could jump on its sprockets which could allow the valves to contact the pistons, resulting in serious engine damage.

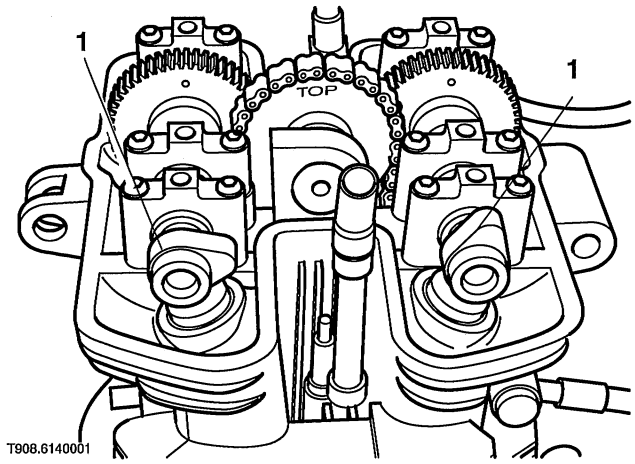
CAUTION: The tensioner is of the spring-loaded type and has a non-return mechanism. If the tensioner mounting bolts are slackened, the tensioner assembly must be removed and its plunger reset before being refitted. Never slacken the mounting bolts slightly and retighten them without resetting the plunger. This will lead to the cam chain being overtensioned, resulting in serious engine damage.

1. Remove the camshaft cover.
2. Remove the alternator cover from the right-hand side of the crankcase (see alternator removal in electrical & ignition system section).

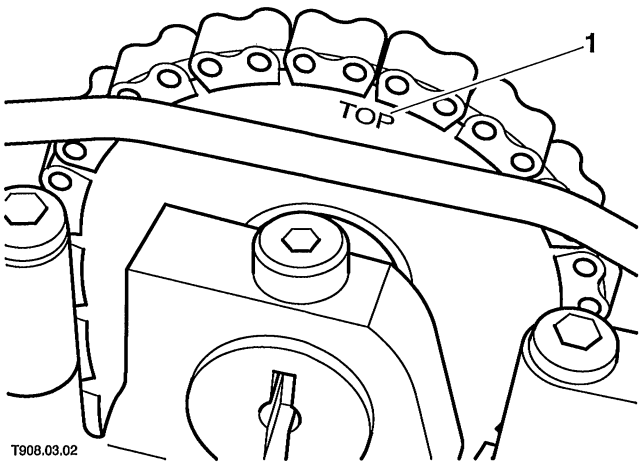
3. Using a socket on the alternator rotor bolt, rotate the crankshaft clockwise until the camshaft lobes of the right-hand cylinder are positioned as shown and the TOP mark on the camshaft drive gear is uppermost.



1. Right-hand cylinder camshaft lobe positions - BONNEVILLE, BONNEVILLE T100 & THRUXTON - 360° firing angle.

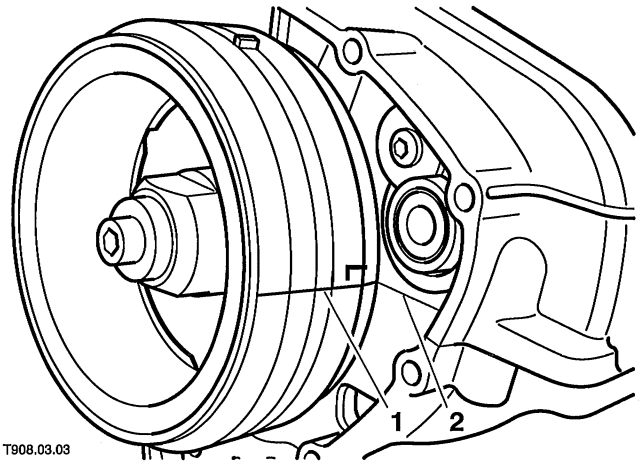


1. Right-hand cylinder camshaft lobe positions - AMERICA, SCRAMBLER & SPEEDMASTER - 270° firing angle.



1. Camshaft drive gear TOP mark

4. On America, Scrambler & Speedmaster, the alternator rotor has two lines, marked 'L' & 'R'. Align the line marked 'L' on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.

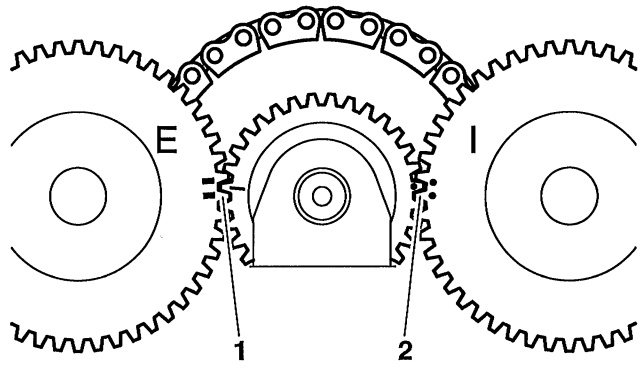


1. Alternator 'L' line (Speedmaster shown)

2. Crankcase joint

5. On Bonneville, Bonneville T100 & Thruxton, the alternator rotor has one line and is not marked with a letter. Align the line marked on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.

6. Check the position of the timing marks on the left-hand side of the camshaft gears and drive gear. The drive gear line should be positioned inbetween the lines on the exhaust camshaft gear and its dot should be positioned inbetween the dots on the inlet camshaft gear.

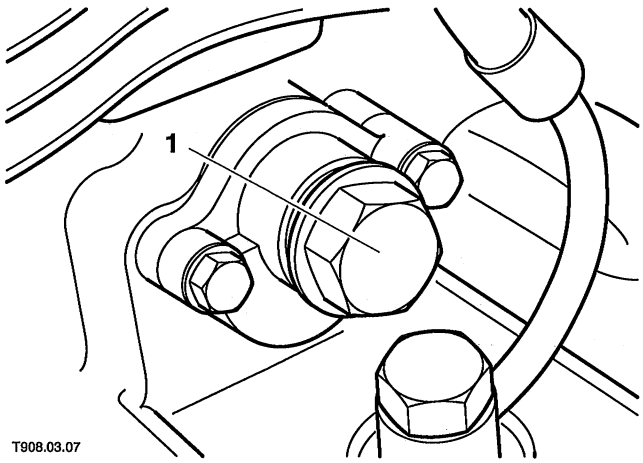


1. Exhaust camshaft timing marks

2. Inlet camshaft timing marks

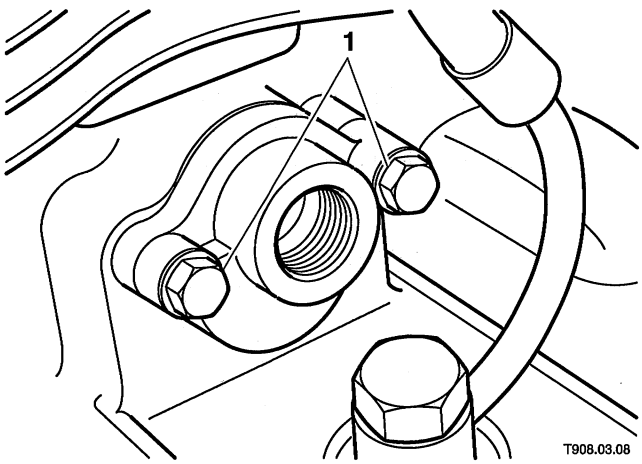
WARNING: The cam chain tensioner centre bolt is under spring tension. Always wear hand, eye and face protection when unscrewing the centre bolt. Take great care to minimise the risk of personal injury and loss of components.

7. Unscrew the centre bolt from the cam chain tensioner and remove the bolt along with its washer and the tensioner spring.



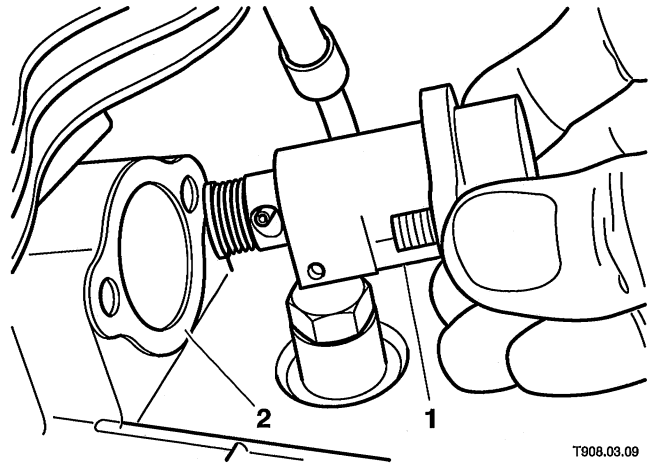
1. Tensioner centre bolt

8. Remove the bolts securing the tensioner body to the crankcase.



1. Tensioner body bolts

9. Remove the tensioner body and gasket.

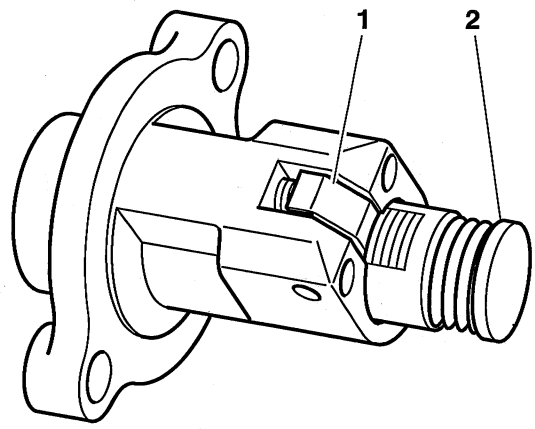


1. Tensioner body

2. Gasket

Inspection

1. Release the ratchet pawl and push the plunger back into the tensioner body. Slowly extend the plunger and check that the pawl 'clicks' securely into each of the grooves of the ratchet and prevents the plunger from being pushed back into the body. If the non-return mechanism is faulty, the tensioner assembly must be renewed.



1. Ratchet pawl

2. Plunger

Installation

WARNING: The cam chain tensioner centre bolt is under spring tension. Always wear hand, eye and face protection when fitting the centre bolt. Take great care to minimise the risk of personal injury and loss of components.

NOTE:

- **If fitting a new tensioner, observe the following:**
  - a. **Remove the new tensioner assembly from the packaging. On examination, it can be seen that the tensioner nut will not be tightened fully into the tensioner body and that the tensioner 'nose' (i.e., the part which actually contacts the chain rubbing strip) is fully retracted into the housing.**
  - b. **Prior to assembly into the engine it is necessary to disassemble the tensioner nut, washer and spring. To do this without damaging the internal components, turn the tensioner nut at least a half turn clockwise (i.e. tighten it further into the housing) until the plunger springs outwards. The tensioner nut can then be withdrawn safely without causing internal damage to tensioner components.**

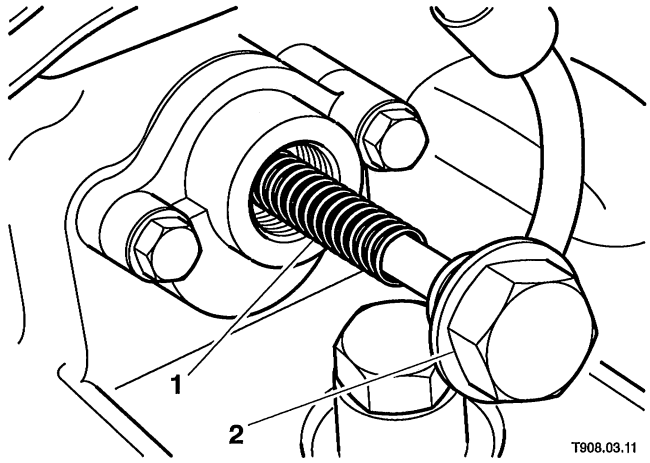
1. Check that the crankshaft and camshaft timing marks are all still correctly aligned. If necessary, remove all slack from the cam chain by inserting a screwdriver in through the tensioner aperture and pushing gently on the rear of the tensioner blade.

2. Ensure the tensioner and crankcase mating surfaces are clean and dry.

3. Release the ratchet pawl and push the plunger back fully into the tensioner body. Extend the plunger slightly so the pawl is set on the first notch of the plunger ratchet.

4. Fit a **new** gasket then install the tensioner body. Fit the mounting bolts and tighten to **9 Nm**.

5. Insert the spring into the tensioner then refit the centre bolt and washer. Tighten the centre bolt to **20 Nm**.



1. Spring

2. Centre bolt

6. Using a socket on the rotor bolt, rotate the crankshaft clockwise through four complete rotations.

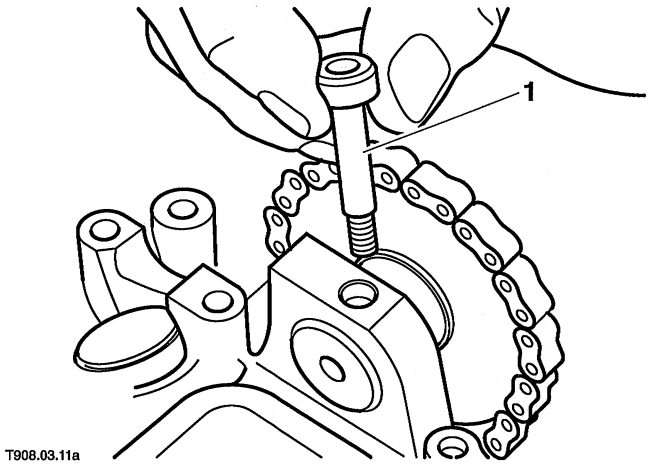
7. Align the rotor timing mark with the crankcase joint to bring the pistons back to TDC then check the camshaft timing marks are correctly positioned.

8. If the timing marks are all correctly aligned, refit the camshaft cover and alternator cover.

CAMSHAFT DRIVE GEAR

Removal

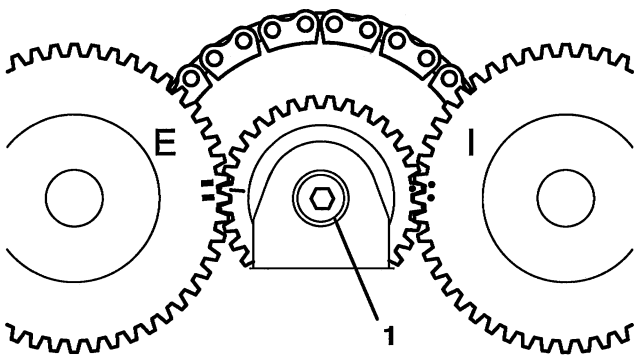
1. Remove the camshafts.
2. Remove the cam chain tensioner.
3. On models with engine numbers up to 186916, remove the drive gear shaft bolt from the top of the cylinder head.



T908.03.11a

1. Drive gear shaft bolt (early type)

4. On models from engine number 186916, unscrew the bolt from the end of the drive gear shaft.



T908.03.04

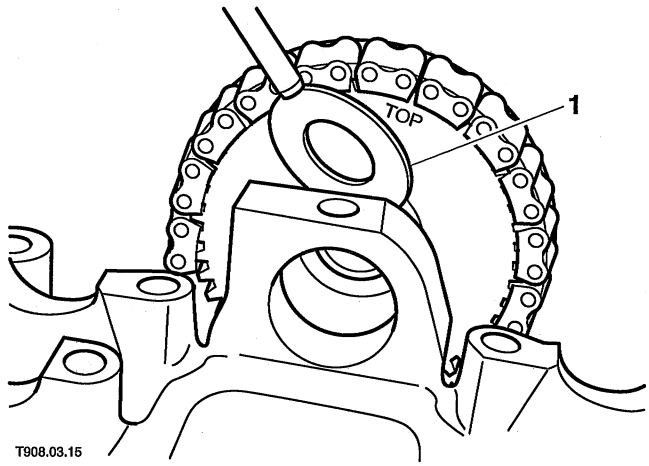
1. Shaft bolt (later type)

NOTE:

- **Models prior to engine number 186916 were fitted with a thrust washer on both sides of the drive gear.**
- **Models from engine number 186916 are fitted with a single thrust washer on the left hand side of the idler gear.**

5. Note the position of the thrust washer(s), support the drive gear and withdraw its shaft. Recover the thrust washer(s) from the drive gear as it is released from the shaft. **DO NOT ALLOW THE THRUST WASHER(S) TO FALL DOWN INTO THE CRANKCASE.**

> ⚠ **CAUTION: If a thrust washer is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.**



T908.03.15

1. Drive gear thrust washer (early type)

6. Free the camshaft drive gear from the chain.

NOTE:

- **Secure the cam chain to ensure that it does not fall into the crankcase during removal of the drive gear.**

Inspection

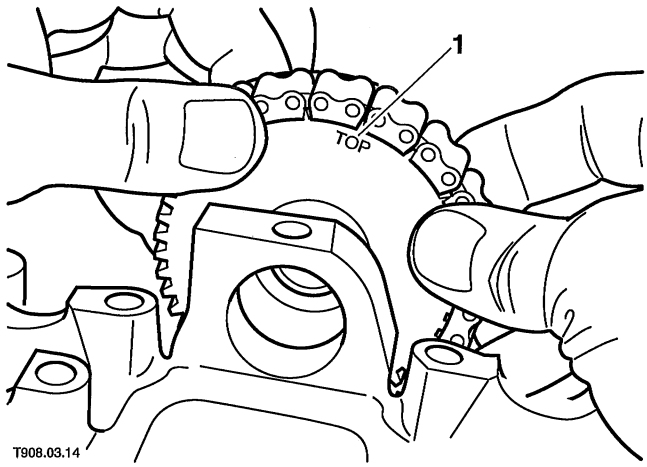
1. Inspect the drive gear needle roller bearings, drive gear teeth and the shaft contact surfaces for signs of wear or damage. If necessary renew both the gear and the shaft.

Installation

1. Ensure the crankshaft is still positioned at TDC (alternator rotor mark facing forwards and aligned with crankcase half joint).

2. Lubricate the needle roller bearings with clean engine oil then manoeuvre the drive gear into position.

3. Ensure the cam chain is correctly engaged with the crankshaft sprocket then engage the drive gear with the chain so that its TOP mark is uppermost.

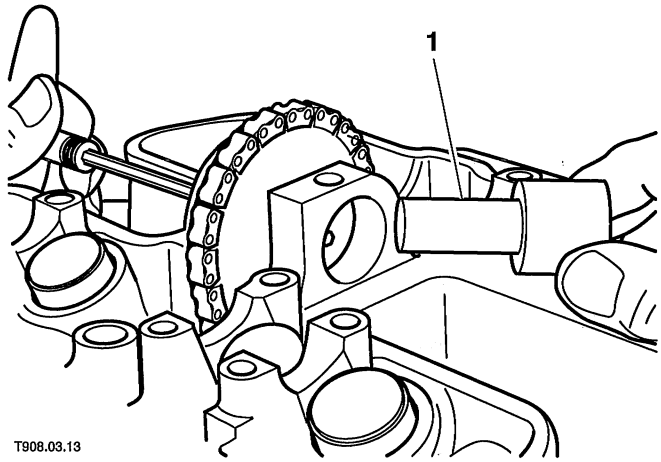


1. Drive gear TOP mark

4. Align the drive gear with its mountings and check the position of its timing marks. The marks must be parallel with the cylinder head upper surface with the line facing forwards and the dot facing backwards.

5. Once the drive gear is correctly engaged with the chain, position the thrust washer(s) as noted earlier and slide the drive gear shaft into position. **DO NOT ALLOW THE THRUST WASHERS TO FALL DOWN INTO THE CRANKCASE.**

> ⚠ **CAUTION: If a thrust washer is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.**



1. Drive gear shaft

6 Push on the rear of the tensioner blade to remove all slack from the cam chain and check the drive gear timing marks are correctly positioned.

7. On models with engine numbers up to 186916, align the drive gear shaft hole with the bolt hole. Insert the bolt and tighten to **10 Nm**.

8. On models with engine numbers from 186917 onwards, insert the bolt into the end of the shaft and tighten to **28 Nm.**

9. Refit the cam chain tensioner and the camshafts.

CYLINDER HEAD

Removal

> **CAUTION: Ensure the engine is completely cold before removing the cylinder head.**

If the engine is in the frame carry out the following:

- Remove seat.
- Disconnect battery negative (-) terminal first.
- Remove fuel tank, exhaust system, carburettors and the secondary air injection system control valve (see fuel system & exhaust section).

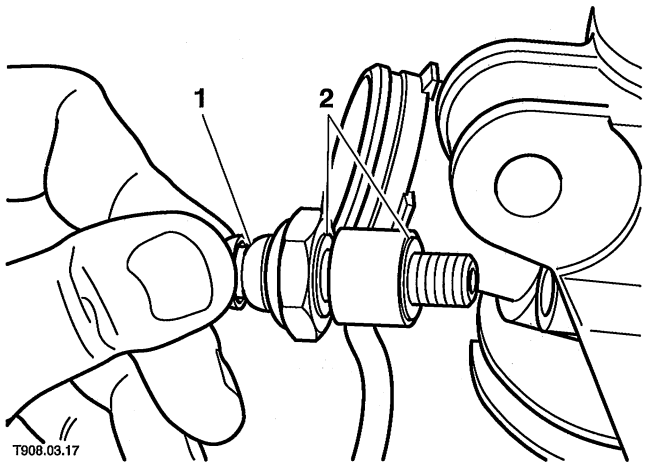
1. Remove the camshafts, cam chain tensioner and the camshaft drive gear.
2. Lift out the tappet buckets complete with shims.

NOTE:

- **Store all tappet buckets and shims in such a way that ensures they will be refitted in their original locations. Interchanging of the buckets and shims will upset the valve clearances.**

1. Tappet bucket with fitted shim

3. Remove the spark plugs.
4. Peel back the rubber cover then remove the screw and disconnect the wiring connector from the low oil pressure warning light switch.
5. Unscrew the low oil pressure warning light switch and disconnect the oil feed pipe from the rear of the cylinder head. Recover the sealing washers and discard them.

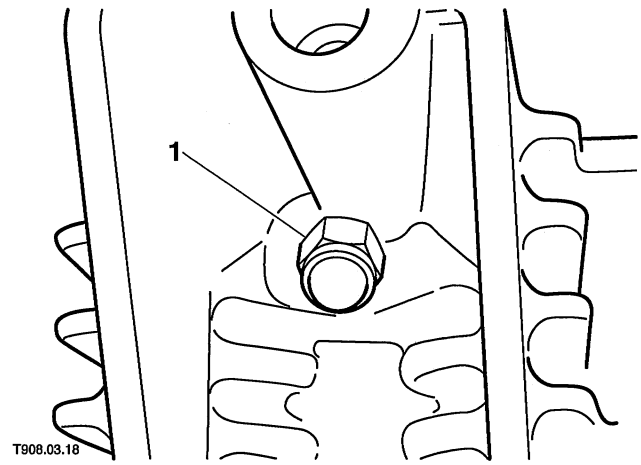


1. Low oil pressure warning light switch

2. Sealing washers

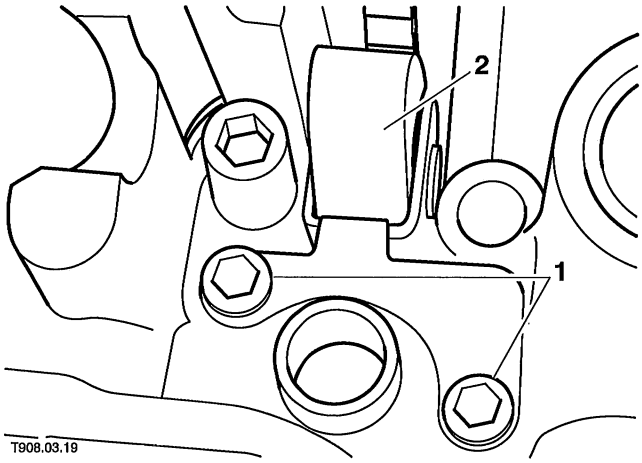
6 Unscrew the banjo bolts securing the oil cooler feed pipes to the cylinder head. Recover the sealing washers and discard them.

7. Remove the nut and washer and lift out the cam chain tensioner blade from the rear of the cylinder head.



1. Tensioner blade nut

8. Remove the two bolts and lift out the cam chain guide blade from the front of the cylinder head.



1. Guide blade bolts

2. Guide blade

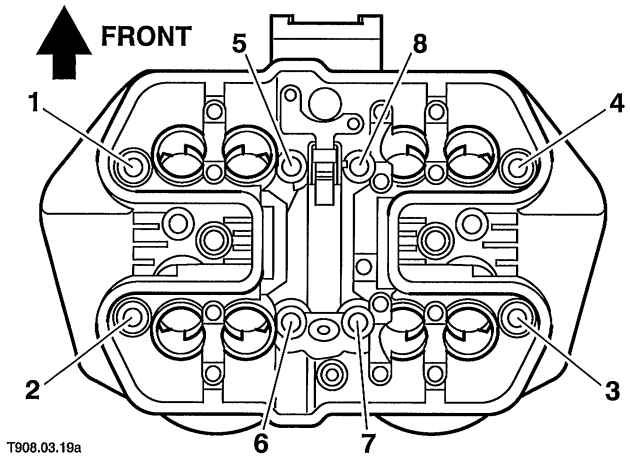
9. Unscrew the nuts securing the mounting bracket(s) to the rear of the cylinder head and the frame. Withdraw the bolt(s) and remove the bracket(s).

NOTE:

- **On America & Speedmaster models, a single bracket is fitted whereas on Bonneville, Bonneville T100, Scrambler & Thruxton there are two separate brackets.**

10. Unscrew the nut and withdraw the engine front upper engine mounting bolt from the cylinder head.

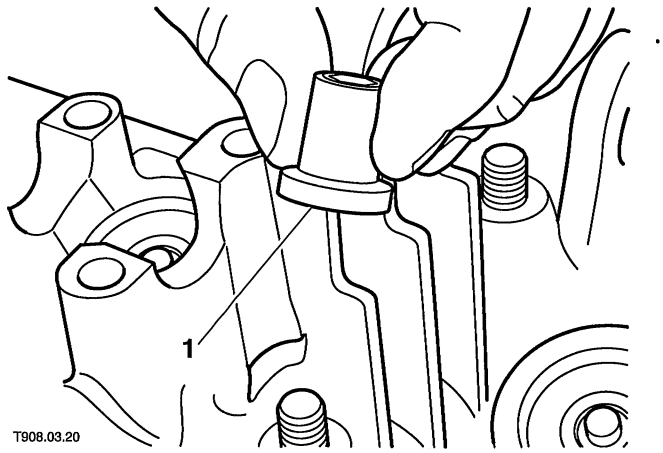
11. Evenly and progressively slacken the cylinder head nuts in the order shown below until all are loose.



Cylinder head nut slackening sequence

12. Remove the cylinder head nuts from their studs. **DO NOT ALLOW THE NUTS TO FALL DOWN INTO THE CRANKCASE.**

CAUTION: If a cylinder head nut is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.



1. Cylinder head nut

13. Carefully break the seal of the head gasket.

CAUTION: Do not strike or lever against the cylinder head cooling fins to break the seal as the fins are easily damaged.

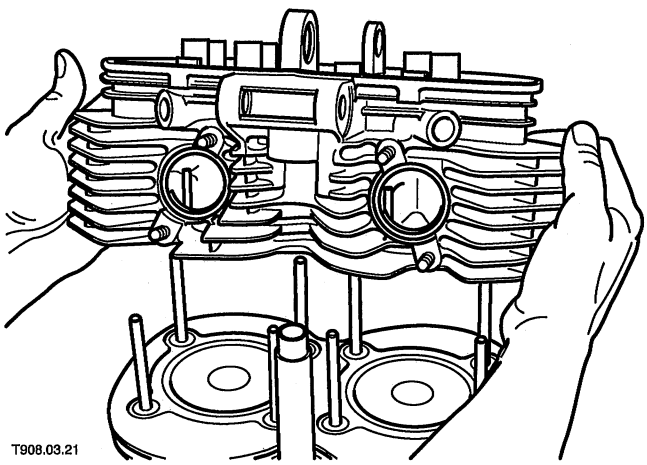
NOTE:

- **Take care not to disturb the barrels when breaking the head gasket seal. If the barrel-to-crankcase gasket seal is broken, the barrels will have to be removed and the base gasket renewed to prevent oil leakage.**

14. Remove the cylinder head taking care not to lose the locating dowels.

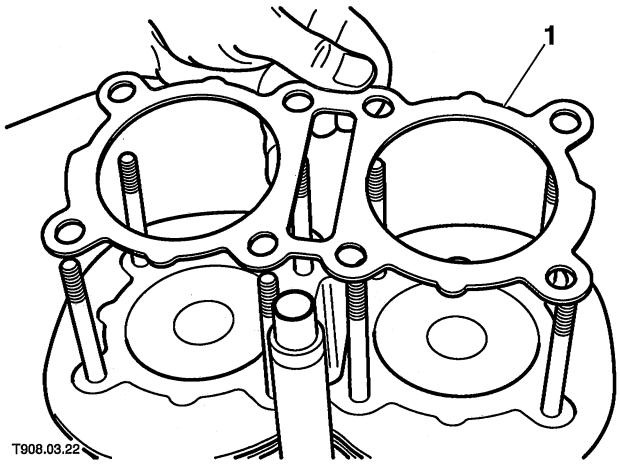
NOTE:

- **Secure the cam chain to ensure that it does not fall into the crankcase during removal of the cylinder head.**



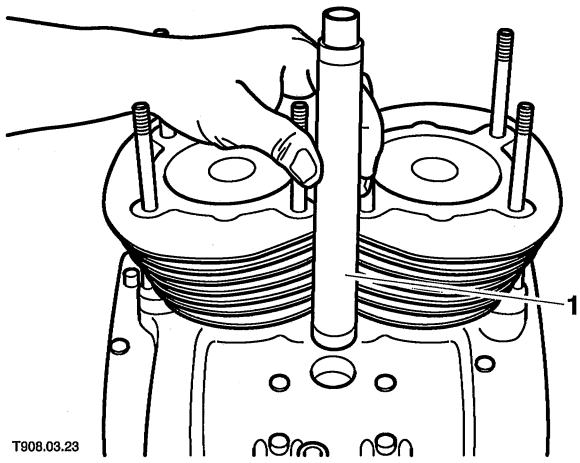
Removing the cylinder head

15. Remove the cylinder head gasket and discard it.



1. Cylinder head gasket

16. Wipe clean the area around the base of the breather tube then remove the tube from the crankcase. Discard the O-rings from the tube.



1. Breather tube

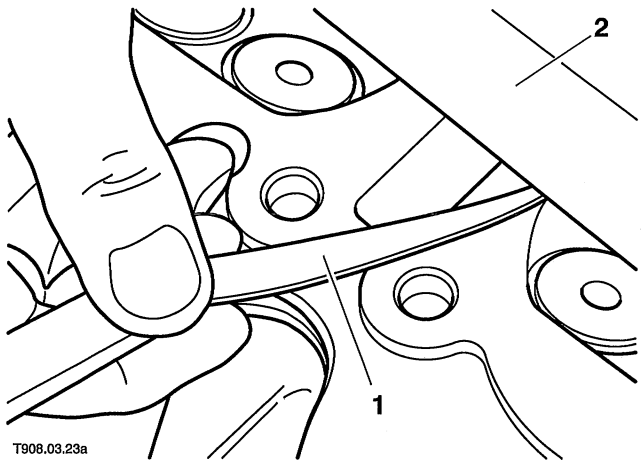
CAUTION: It is strongly recommended that, when the cylinder head is removed, the barrels are also removed in order to renew the base gasket. For details, refer to the barrels and pistons section.

Failure to renew the base gasket could cause an oil leak which could lead to engine damage.

Inspection

1. Thoroughly clean the surface of the cylinder head and check for damage and/or pitting of the combustion chambers.

2. Using a straight edge, check the cylinder head gasket face for warp which could lead to gasket failure. Replace the cylinder head if warpage exceeds the specified limit.



1. Feeler gauge

2. Straight edge

Cylinder head gasket face warpage

Standard	**Less than 0.03 mm**
Service limit	**0.07 mm**

3. Check each tappet bucket outer surface for signs of wear. Renew any damaged bucket.

NOTE:

- **If a damaged tappet bucket is found, closely examine the cylinder head. If the tappet bucket bore is damaged, the cylinder head must be renewed.**

4. Check the cam chain tensioner and guide blades. Renew if worn or damaged.

5. Inspect the cylinder head studs and nuts closely for signs of damage. Renew the studs and nuts if their threads show any sign of damage or tapering (due to overtightening).

Installation

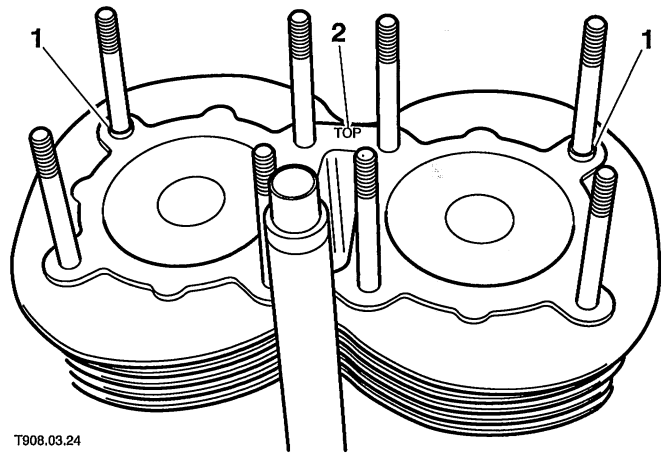
1. Thoroughly clean the mating surfaces of the cylinder head and barrels taking care not to damage the mating surfaces.

2. Fit a **new** O-ring to the groove at each end of the breather tube. Lubricate the O-rings with clean engine oil then refit the breather tube to the crankcase.

3. Fit a new cylinder head gasket ensuring that the locating dowels are correctly in place. The gasket must be fitted with its TOP marking facing upwards at the rear.

NOTE:

- **When new, the cylinder head gasket may appear slightly warped. This is due to the manufacturing process and is perfectly normal.**



1. Locating dowels

2. TOP marking location

4. Carefully lower on the cylinder head, passing the cam chain up through the head. Align the breather tube with the head and locate the head on its dowels.

NOTE:

- **Secure the cam chain to ensure that it does not fall into the crankcase during installation of the cylinder head.**

5. Screw the cylinder head nuts onto their studs and tighten them all by hand. **DO NOT ALLOW THE NUTS TO FALL DOWN INTO THE CRANKCASE.**

CAUTION: If a cylinder head nut is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.

6. The cylinder head nuts are tightened in three stages. This is to ensure that the cylinder head gasket seals correctly to the cylinder head and barrels. The three stages are as follows:

NOTE:

- **In stages A and B a torque wrench of known and accurate calibration must be used.**

A Tighten the cylinder head nuts, in the sequence shown, to **20 Nm.**

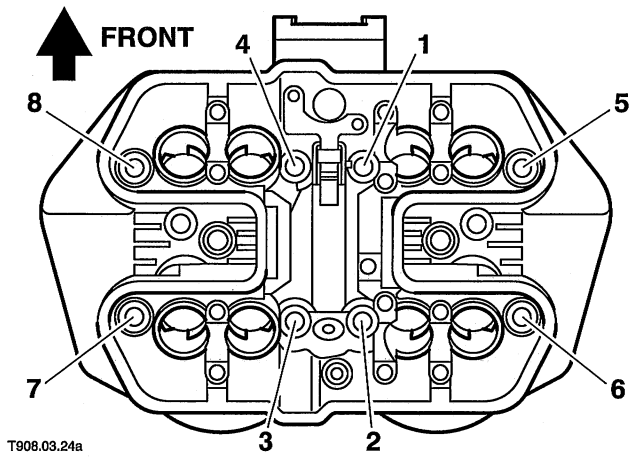
B Tighten the cylinder head nuts, in the sequence shown, to torque **30 Nm.**

C Finally tighten the cylinder head nuts, in the sequence shown, through a further **90°**.

NOTE:

- **Use service tool 3880105-T0301 to ensure accuracy when angle-tightening.**

CAUTION: Failure to use the correct procedure to tighten the cylinder head nuts could result in failure of the cylinder head gasket.

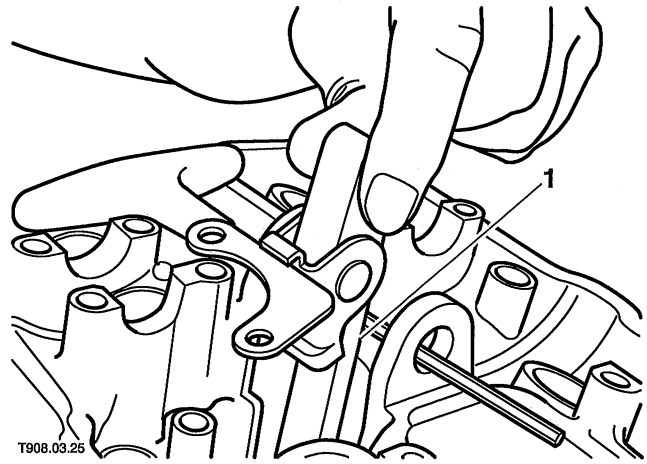


Cylinder head nut tightening sequence

7. Fit the engine front upper mounting bolt and nut and tighten to **80 Nm.**

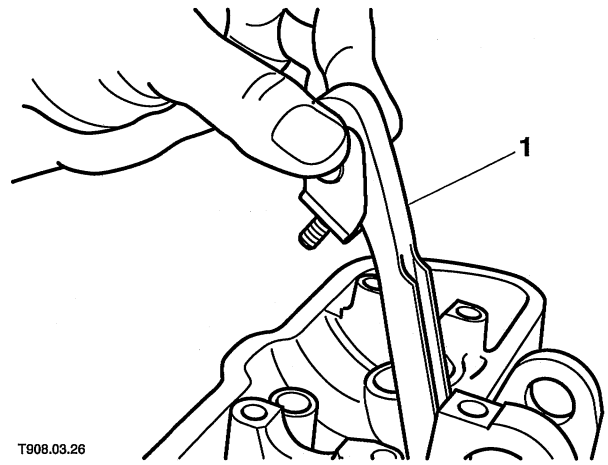
8. Refit the cylinder head to frame mounting brackets and fit the bolts and nuts. Tighten the bracket to cylinder head bolt to **80 Nm** and the bracket to frame bolt to **22 Nm.**

9. Fit the cam chain guide blade to the front of the cylinder head and tighten its retaining bolts to **10 Nm.**



1. Guide blade

10. Fit the cam chain tensioner blade to the rear of the cylinder head. Fit the washer and nut to the blade and tighten to **10 Nm.**



1. Tensioner blade

11. Position a **new** sealing washer on each side of the oil cooler feed pipe end fittings then secure the pipes to the cylinder head with the banjo bolts. Tighten the bolts to **30 Nm**.

12. Position a **new** sealing washer on each side of the oil feed pipe end fitting then screw in the low oil pressure warning light switch. Tighten the switch to **13 Nm** then securely reconnect the wiring connector and seat the rubber boot over the switch.

13. Lubricate the tappet buckets with clean engine oil then fit the bucket and shim assemblies to the cylinder head.

NOTE:

- **Ensure all tappet buckets and shims are refitted in their original locations. Interchanging of the buckets and shims will upset the valve clearances.**

14. Refit the camshaft drive gear, the cam chain tensioner and the camshafts.

15. Fit the spark plugs and tighten to **20 Nm**.

16. Refit all components removed for access.

VALVES

Removal

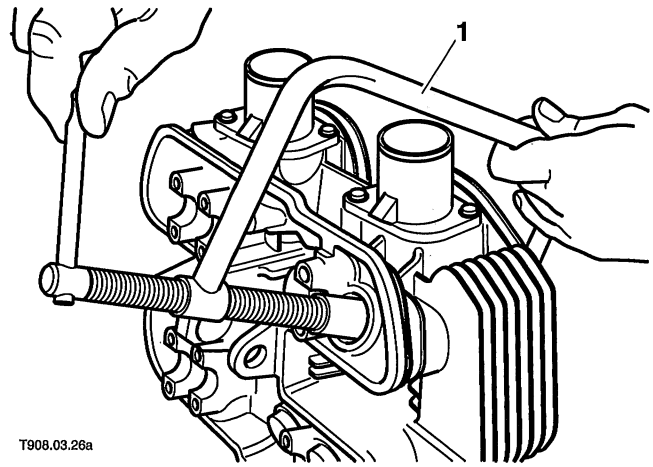
NOTE:

- **Store each valve and its associated components together in such a way that ensures all components are refitted in their original locations.**

1. Remove the cylinder head. Each valve can then be removed as follows.

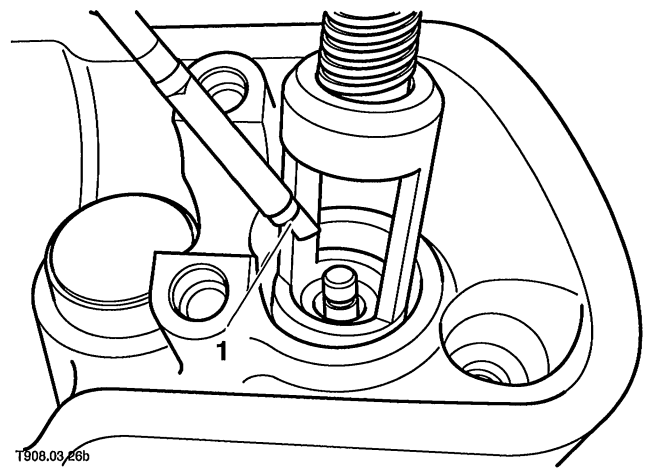
2. Using a valve spring compressor, compress the spring retainer sufficiently until the collets can be removed.

WARNING: Always wear hand, eye and face protection when using a valve spring compressor. Take great care to minimise the risk of personal injury and loss of components.



1. Valve spring compressor

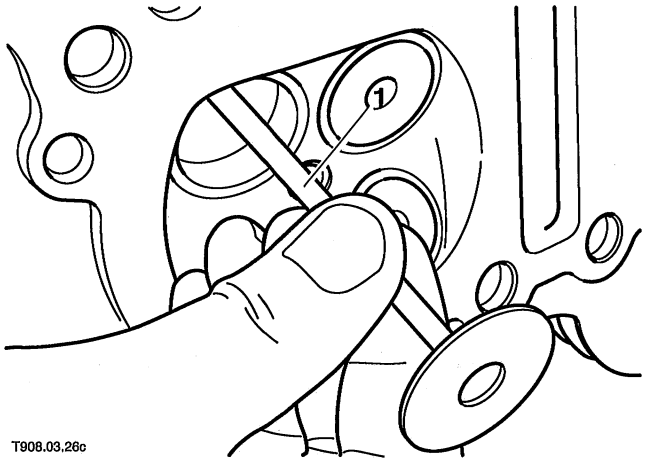
3. With the collets removed, carefully release the spring compressor.



1. Collet (on the end of a magnet)

4. Lift off the spring retainer, valve spring and spring seat.

5. Slide the valve out of its guide. If necessary, deburr the valve before removal.



1. Valve

6. Remove the valve stem seal from the guide.

Inspection

1. Remove any carbon build-up from the face of the valve and closely inspect the valve head and seat face. If any sign of cracking or pitting is found renew the valve.

2. Measure the valve stem diameter at several points along its length. If the stem diameter is outside the specified limits, renew the valve.

Valve stem diameter

Inlet

Standard	**5.463 to 5.478 mm**
Service limit	**5.453 mm**

Exhaust

Standard	**5.451 to 5.466 mm**
Service limit	**5.441 mm**

3. Measure the valve guide bore diameter at several points along its length. If the guide bore diameter is outside the specified limits, the cylinder head must be renewed.

Valve guide bore diameter

Standard	**5.500 to 5.515 mm**
Service limit	**5.543 mm**

4. Calculate the valve stem to guide clearance. If the clearance exceeds the specified limits, the cylinder head will have to be renewed.

Valve stem to guide clearance

Inlet

Standard	**0.01 to 0.04 mm**
Service limit	**0.07 mm**

Exhaust

Standard	**0.03 to 0.06 mm**
Service limit	**0.09 mm**

5. Measure the valve seat width in the cylinder head at several points. If the seat width is outside the specified limits, the valve seat will have to be repaired (if possible) or the cylinder head will have to be renewed.

Valve seat width in head

Standard	**0.9 to 1.1 mm**
Service limit	**1.5 mm**

Valve seat width on valve

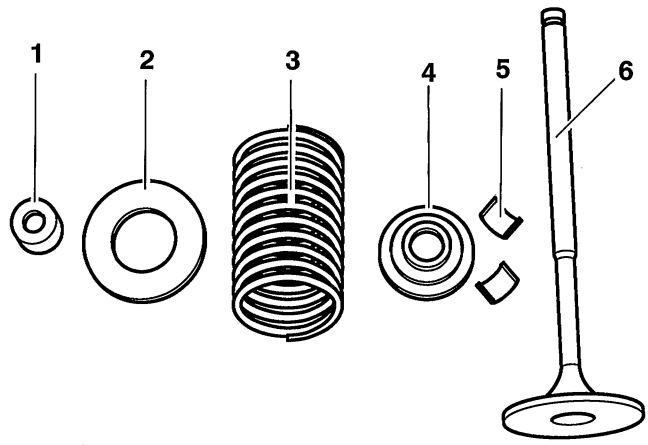
Standard	**1.27 to 1.56 mm**
Service limit	**1.56 mm**

6. Measure the free length of each valve spring. If the spring length is outside the specified limits it must be renewed.

Valve spring free length

Standard	**42.4 mm**
Service limit	**41.7 mm**

Installation



T908.03.26d

1. Valve stem seal
2. Spring seat
3. Spring
4. Spring retainer
5. Collets
6. Valve

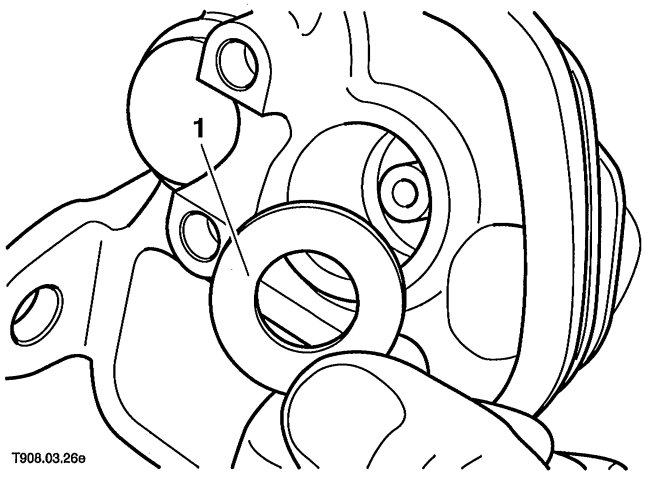
1. Locate the **new** valve stem seal on the end of the valve guide. Press the seal fully onto the guide, taking care not to damage its sealing lip or ring.

CAUTION: Incorrect fitment of the valve stem oil seals could lead to high oil consumption and blue smoke emissions from the exhaust system. Do not use excessive force in fitting the seal as this may break the seal ring.

2. Apply a thin coat of molybdenum disulphide grease to the valve stem.

3 Install the valve into the valve guide, easing it gently through the seal.

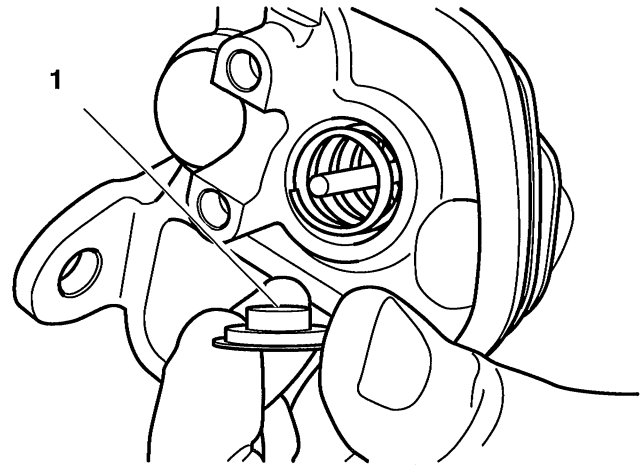
4. Fit the spring seat.



T908.03.26e

1. Spring seat

5. Fit the valve spring then fit the spring retainer to the top of the spring.



1. Spring retainer

6. Using the spring compressor, compress the spring retainer sufficiently to expose the collet groove.

WARNING: Always wear hand, eye and face protection when using a valve spring compressor. Take great care to minimise the risk of personal injury and loss of components.

7. Install the collets, ensuring they are correctly located in the collet groove, then carefully release the spring compressor.

CAUTION: Ensure both collets are correctly located in the valve and spring retainer. If not, they could become dislodged when the engine is running resulting in serious engine damage.

BARRELS & PISTONS

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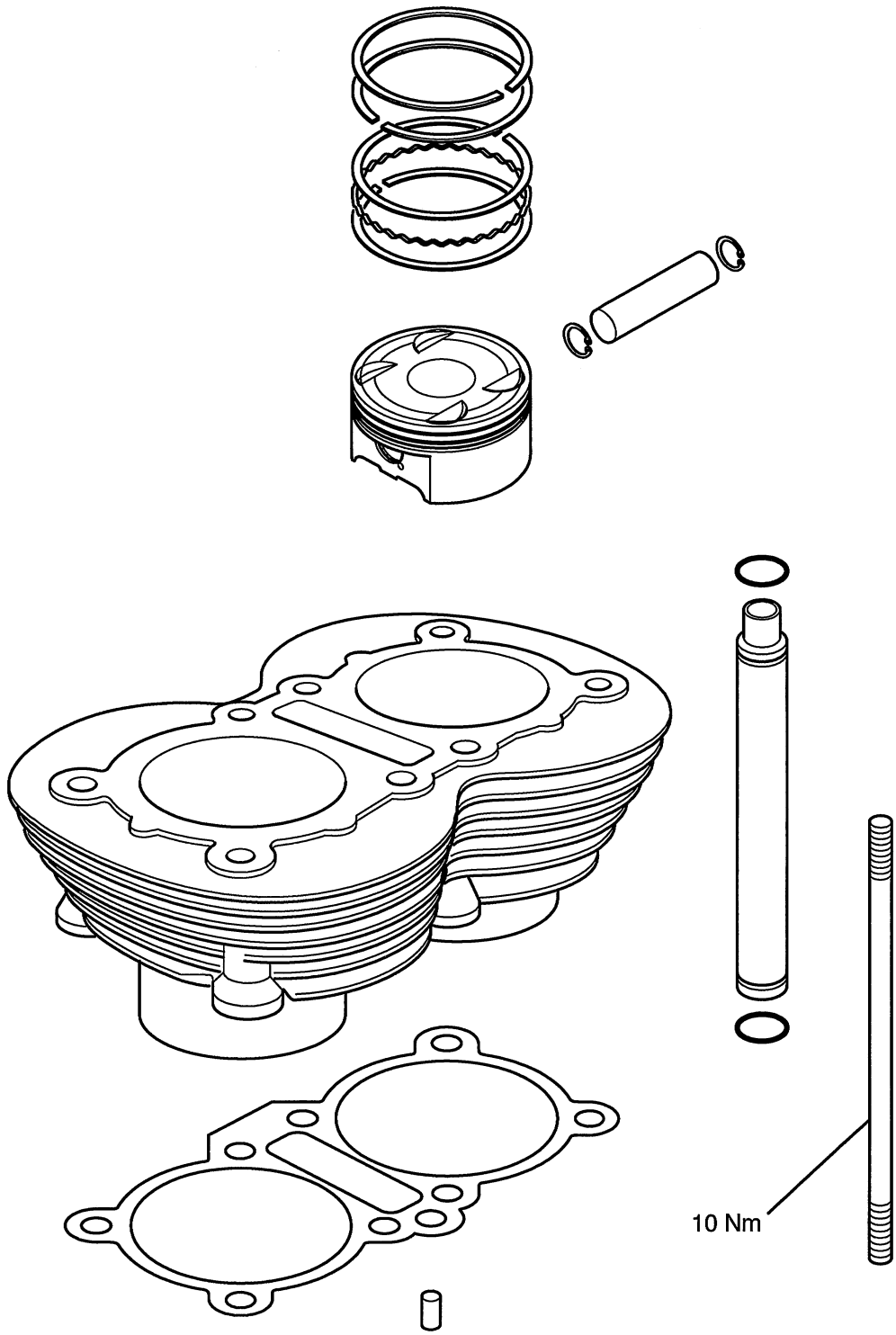
Exploded View
Barrels and Pistons



BARRELS

Removal

1. Remove the cylinder head.
2. Clean the area around the barrel base gasket joint to prevent dirt falling into the crankcase when the barrels are removed.
3. Ensure the pistons are level with each other then break the seal of the base gasket joint.

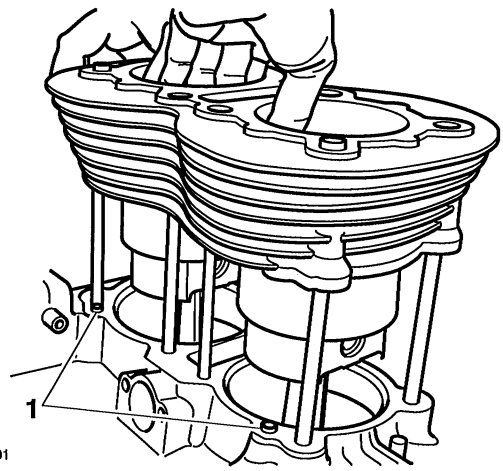
CAUTION: Do not strike or lever against the barrel cooling fins to break the seal as the fins are easily damaged.

NOTE:

- **Secure the cam chain to ensure that it does not fall into the crankcase during removal of the barrels.**

4. Lift off the barrels, taking care not to lose the locating dowels.

CAUTION: Support the pistons as the barrels are removed to prevent piston damage.



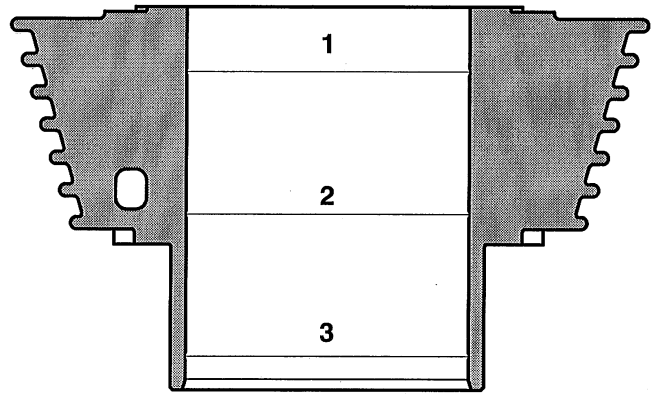
T908.04.01

1. Locating dowels

5. Remove the base gasket and discard it.

Inspection

1. Measure the diameter of each cylinder bore using an internal micrometer or similar accurate measuring equipment.



T908.04.01a

Cylinder bore diameter measurement points

Cylinder bore diameter - 790cc engines

Standard	**85.991 to 86.009 mm**
Service Limit	**86.034 mm**

Cylinder bore diameter - 865cc engines

Standard	**89.991 to 90.009 mm**
Service Limit	**90.034 mm**

NOTE:

Check the diameter at points 1, 2 and 3.

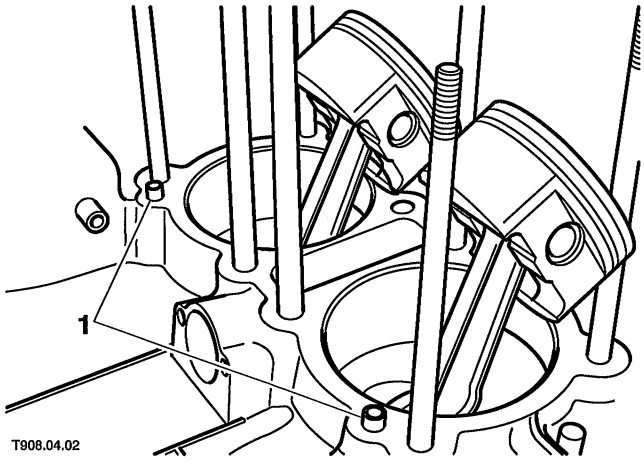
- **If any readings are outside the service limit, replace the barrels and pistons.**

Installation

NOTE:

1 Thoroughly clean the mating surfaces of the crankcase and barrels taking care not to damage the mating surfaces.

2. Fit a new base gasket ensuring that the locating dowels are correctly in position.



1. Locating dowels

3. While supporting the pistons to prevent contact with the crankcase, position the pistons level with each other.

CAUTION: Do not allow the pistons to fall against the crankcase when turning the engine. Piston and/or crankcase damage could occur if the pistons are not supported while turning the engine.

4. Ensure the piston ring end gaps are correctly positioned (see pistons and rings installation).

5. Ensure the barrels are completely clean.

6. Lubricate the piston rings and the cylinder bores with clean engine oil.

7. Carefully lower the barrels onto the pistons, passing the cam chain up through the barrels.

NOTE:

- **Secure the cam chain to ensure that it does not fall into the crankcase during installation of the barrels.**
- **Installation will be considerably easier with the aid of an assistant.**

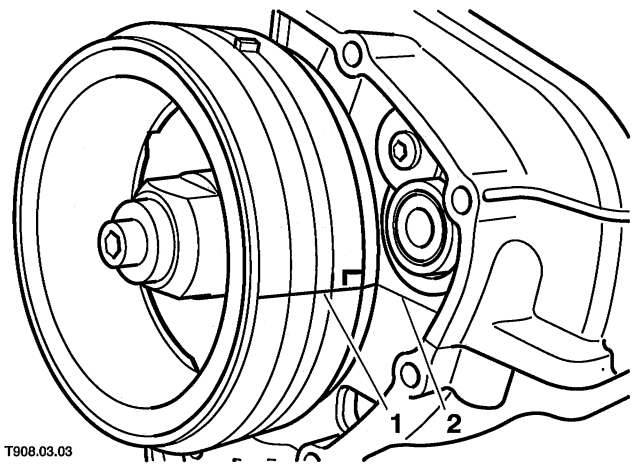
CAUTION: Do not allow the full weight of the barrels to rest unsupported on the pistons. Failure to support the barrels is likely to result in piston ring breakage.

8. Ease the barrels carefully down over the pistons whilst guiding the piston rings into the base of the cylinder bores.

CAUTION: Do not force the pistons into their bores. The base of each bore is chamfered to ease installation and excess force should not be needed. If either piston jams, lift the barrels slightly and check the rings are correctly located in their grooves before continuing. The use of force is likely to result in piston ring breakage.

9. Slide the barrels fully down and locate on the dowels.

10. On America, Scrambler & Speedmaster, the alternator rotor has two lines, marked 'L' & 'R'. Align the line marked 'L' on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.



1. Alternator 'L' Line (America shown)

2. Crankcase Joint

11. On Bonneville, Bonneville T100 & Thruxton, the alternator rotor has one line and is not marked with a letter. Align the line marked on the alternator rotor with the crankcase joint at the front of the rotor to bring the engine to its timing position.

12. Refit the cylinder head.

PISTONS AND RINGS

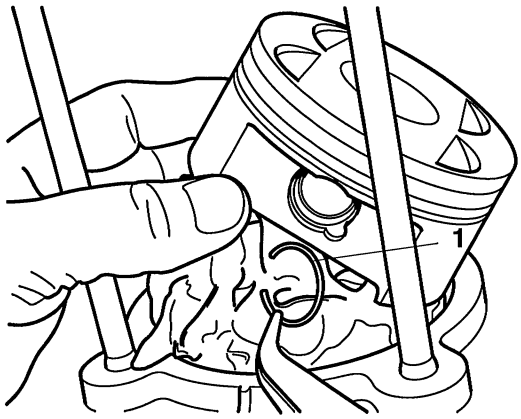
Removal

1. Remove the barrels.
2. Position each piston at TDC. Each piston can be removed as follows.
3. Remove the gudgeon pin circlip from the outside of the piston. Discard the circlip.

NOTE:

- **Place a cloth between the piston and crankcase to ensure the circlip does not fall into the crankcase.**

CAUTION: If a circlip is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.



T908.04.02a

1. Circlip

4. Push the gudgeon pin out from the inside of the piston and withdraw the piston from the connecting rod.
5. Remove the remaining circlip from the piston and discard it.

NOTE:

- **If both pistons are being removed, mark each piston in some way to ensure it is refitted in its original location.**

6. Prior to removing the rings, check the ring-to-groove clearance of each compression ring (see inspection).
7. Ease the top compression ring out of its groove and remove it from the top of the piston.

CAUTION: Do not expand the piston rings anymore than is necessary to allow them to be removed from the piston. The rings are brittle and will break if expanded too much.

8. Remove the second compression ring in the same way.

NOTE:

- **The top and second compression rings are different and are not interchangable (see installation).**

9. Remove the oil control rings and expander.

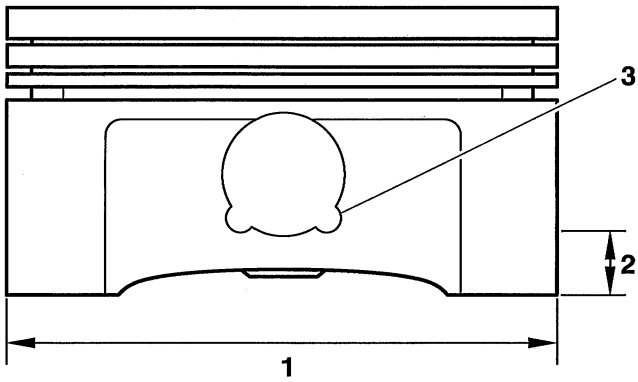
NOTE:

- **If the piston rings are going to be re-used, keep them with their respective piston to ensure they are refitted in their original locations.**

Inspection

1. Remove any carbon build-up from the piston crown. Inspect the piston crown for signs of pitting and check the piston skirt and ring grooves for signs of wear or scuffing. If any sign of damage is found, renew the piston.

2. Measure the piston outside diameter 13 mm up from the bottom of the skirt. Measure at 90° from the axis of the gudgeon pin.



T908.04.02b

1. Piston outside diameter

2. Measurement point (13 mm up the piston skirt)

3. Gudgeon pin bore

Piston outside diameter - 790cc engines

Standard	**85.975 to 85.990 mm**
Service limit	**85.935 mm**

Piston outside diameter - 865cc engines

Standard	**89.972 to 89.988 mm**
Service limit	**89.933 mm**

NOTE:

- **Replace the piston if the measured diameter falls outside the specified limit.**

3. Check each piston ring end gap as follows.

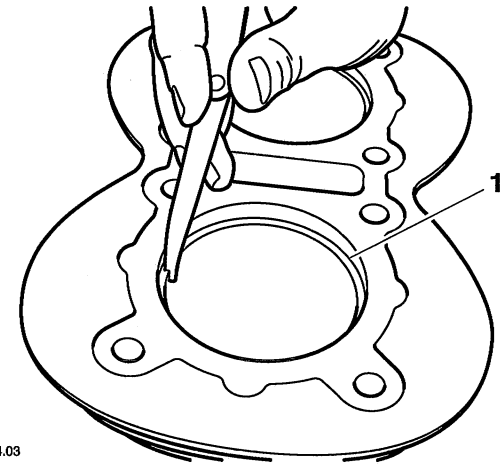
NOTE:

- **The piston ring end gap must be measured in the cylinder bore which the piston ring will be fitted to on installation.**

a. Ease the piston ring into the top of the cylinder bore.

b. Using the piston crown, push the piston ring down into the bore (the piston will keep the piston ring square) until the third groove of the piston is level with the top of the bore.

c. Remove the piston and measure the gap between the ends of the piston ring, using a feeler gauge.



T908.04.03

Checking piston ring (1) end gap

Piston ring end gap - 790cc engines

Top ring end gap

Standard	**0.12 - 0.33 mm**

Second ring end gap

Standard	**0.27 - 0.48 mm**

Oil control rings

Standard	**0.17 - 0.73 mm**

Piston ring end gap - 865cc engines

Top ring end gap

Standard	**0.17 - 0.33 mm**

Second ring end gap

Standard	**0.32 - 0.48 mm**

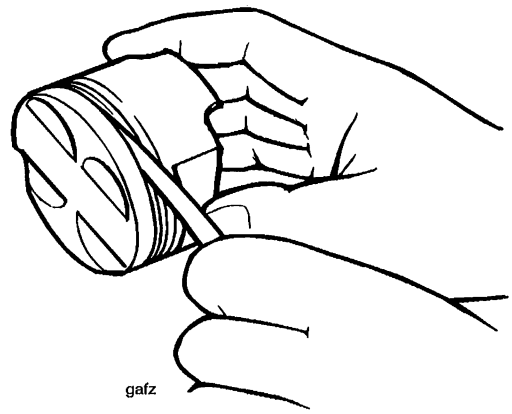
Oil control rings

Standard	**0.17 - 0.73 mm**

NOTE:

- **If the end gap is too large, replace the piston rings with a new set**
- **If the gap remains too large with new piston rings, both the pistons and barrels must be replaced**
- **If the gap is too small, check the cylinder bore for distortion, replacing as necessary. Do not file piston rings!**

4. With the piston rings correctly installed on the piston, check the ring-to-groove clearance of each compression ring, using a feeler gauge.



Piston ring-to-ring groove clearance check

Piston ring-to-groove clearance - all models

Standard	**0.02 - 0.06 mm**

NOTE:

- **If the ring-to-groove clearance is too large, replace the piston rings with a new set**
- **If the gap remains too large with new piston rings, the piston must also be replaced**
- **If the gap is too small, check the piston ring grooves closely for distortion, replacing the piston as necessary. Do not file the ring grooves!**

Installation

1. Ensure the piston ring grooves are clean.
2. Fit the oil control ring expander to the piston then install the upper and lower control rings (the oil control rings are both the same and can be fitted either way up).

NOTE:

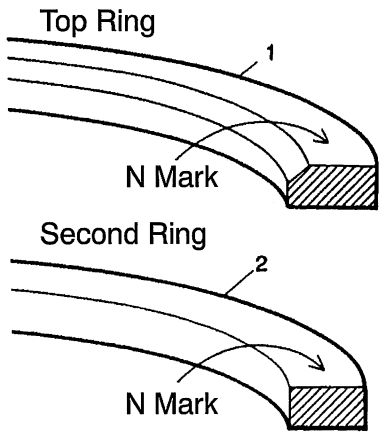
- **Ensure all piston rings are fitted in their original locations (if original rings are being reused) or to the piston/bore which the end gaps were checked (if new rings are being fitted).**

CAUTION: Do not expand the piston rings anymore than is necessary to allow them to be installed on the piston. The rings are brittle and will break if expanded too much.

3. Fit the second compression ring carefully to the piston, ensuring its N mark is facing upwards.

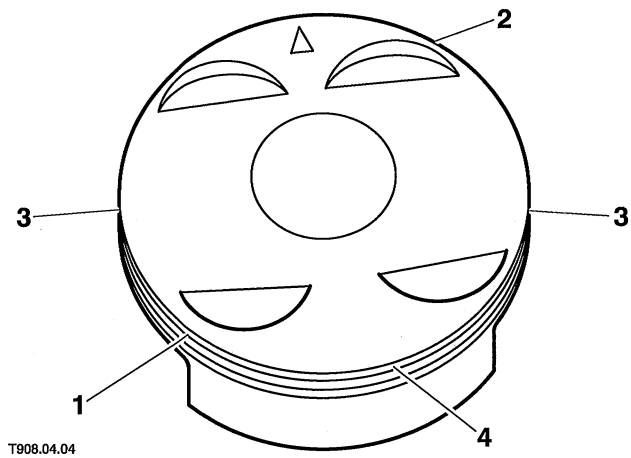
NOTE:

- **The second and top compression rings are different and are not interchangable. The top ring can be identified by the chamfer on its upper inside edge, the second ring has no chamfer. ENSURE THE SECOND AND TOP COMPRESSION RINGS ARE CORRECTLY INSTALLED.**



Piston ring identification

4. Fit the top compression ring to the piston ensuring its N mark is facing upwards.
5. Ensure all piston rings move freely in their grooves.
6. Position the piston ring end gaps as follows (piston viewed from above, triangular mark facing forwards).



Piston ring end gap locations

1. Top Ring

2. Second Ring

3. Steel Oil Control Rings

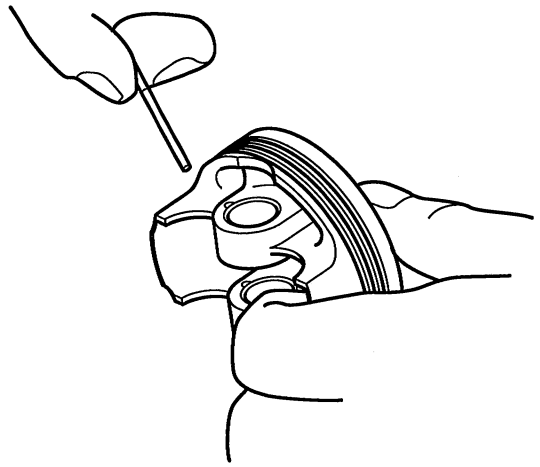
4. Oil Control Ring Expander

NOTE:

- **The top compression ring end gap should be in the 7 o'clock position**
- **The second compression ring end gap should be in the 1 o'clock position**
- **The oil control ring end gaps should be in the 3 and 9 o'clock positions (one in each position)**
- **The oil control ring expander end gap should be in the 6 o'clock position**

7. Fit a **new** circlip to the inside of the piston. Ensure the circlip is correctly located in the piston groove.

WARNING: Failure to use new circlips could allow a gudgeon pin to work its way out from the piston. This could seize the engine and lead to an accident.



05.25-2

Circlip fitment

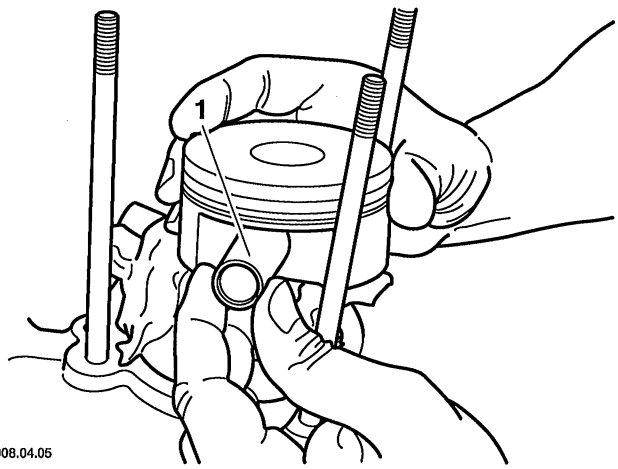
8. Lubricate the connecting rod small-end and gudgeon pin with clean engine oil.

9. Align the piston with the connecting rod, ensuring the triangular mark on the piston crown is facing towards the front of the engine.

NOTE:

- **If the original pistons are being refitted, ensure they are fitted in their original locations.**

10. Insert the gudgeon pin into the piston and push it fully into position.



T908.04.05

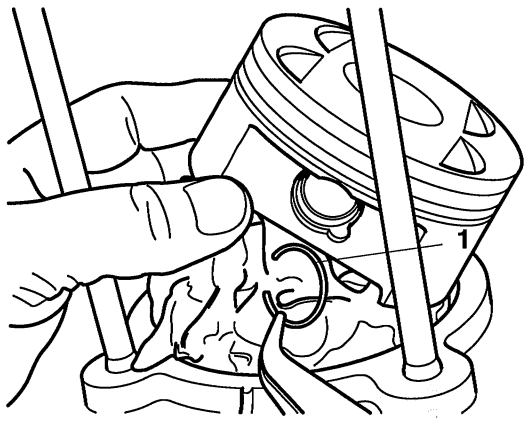
1. Gudgeon Pin

11. Secure the gudgeon pin in position with the remaining **new** circlip. Ensure the circlip is correctly located in the piston groove.

NOTE:

- **Place a cloth between the piston and crankcase to ensure the circlip does not fall into the crankcase.**

CAUTION: If a circlip is dropped into the crankcase, it must be recovered before the crankshaft is rotated. Failure to do so will result in serious engine damage.



T908.04.02a

1. Circlip

12. Install the remaining piston then refit the barrels.

CAUTION: Do not allow the pistons to fall against the crankcase when turning the engine. Piston and/or crankcase damage could occur if the pistons are not supported while turning the engine.

CLUTCH

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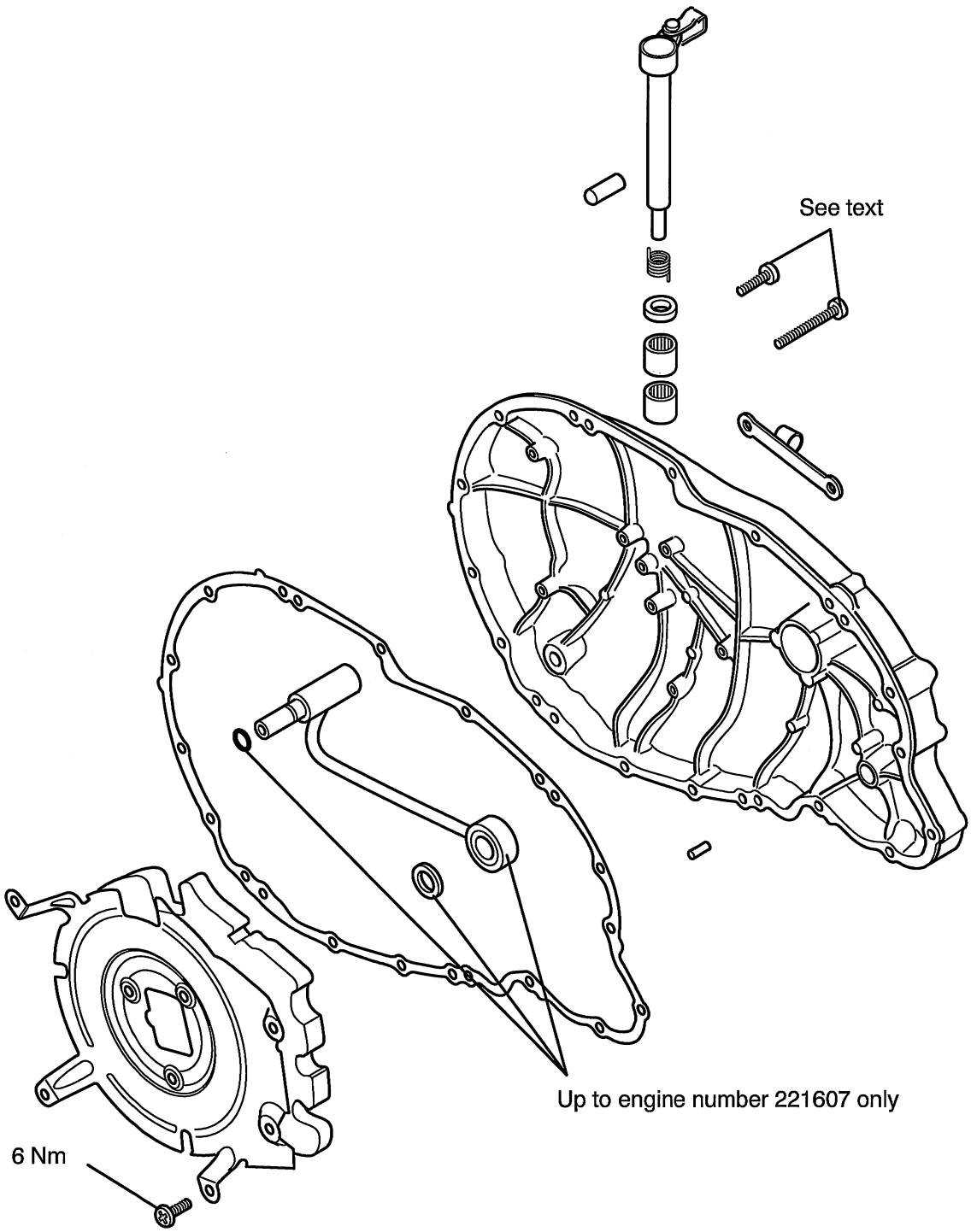
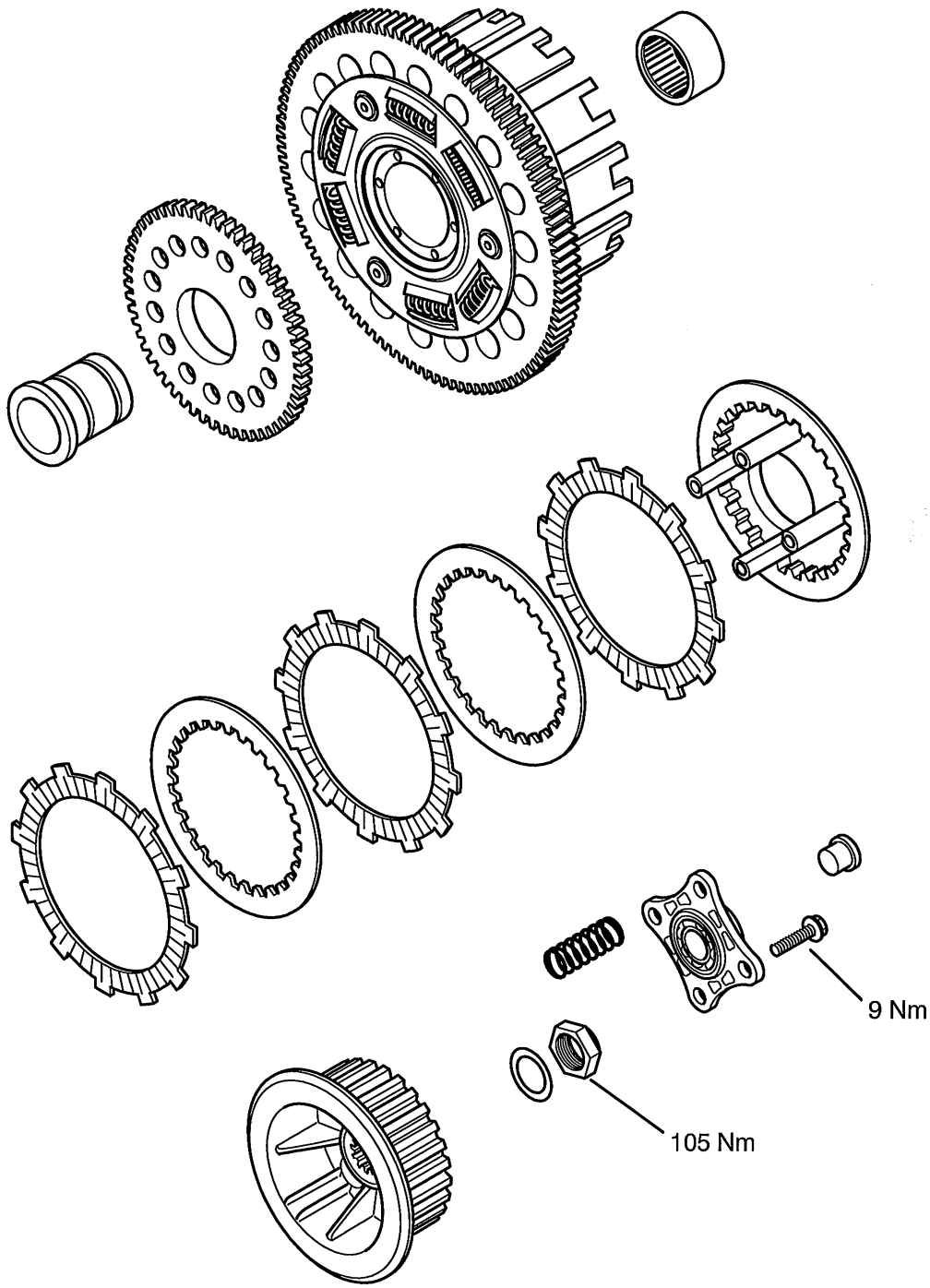
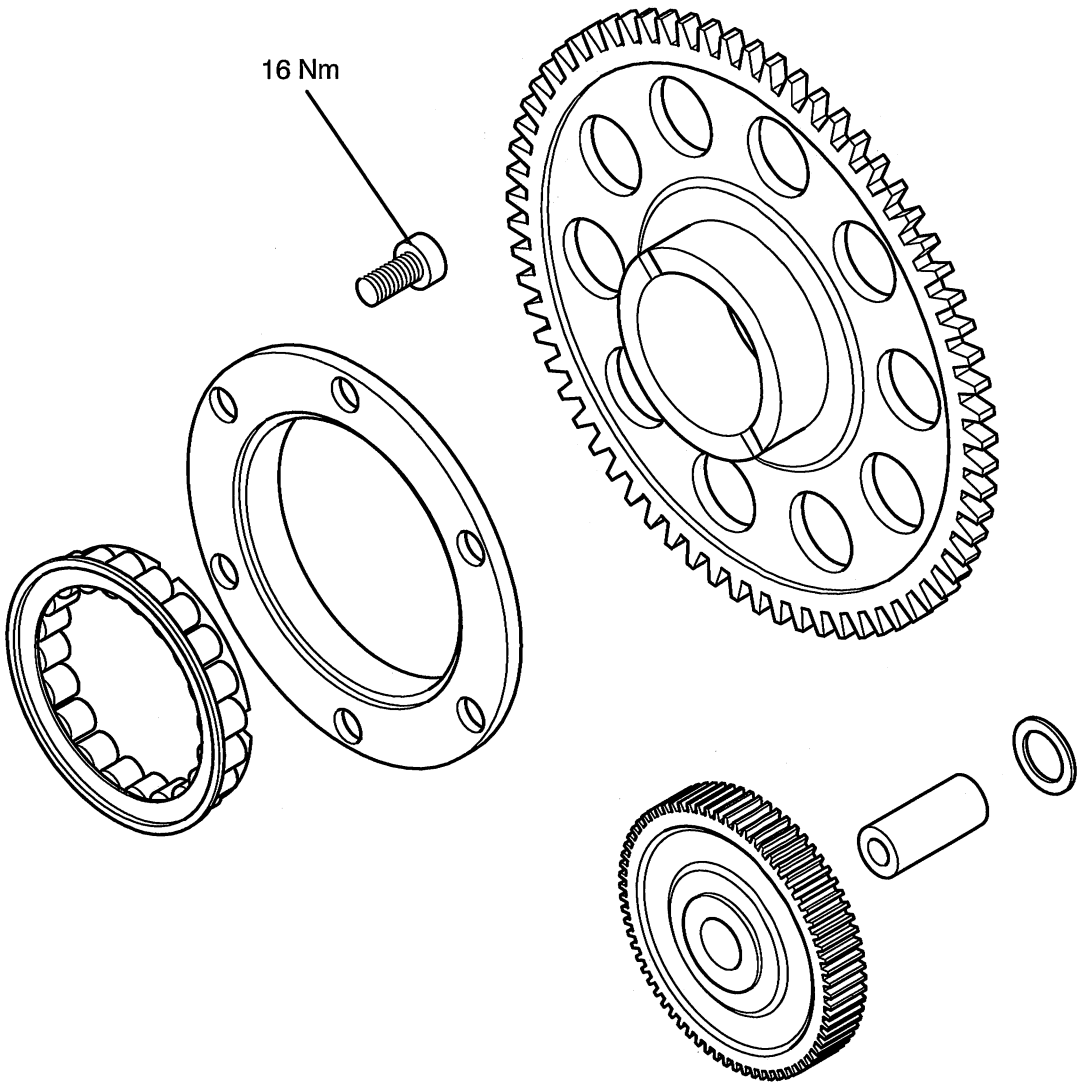
Exploded View
Clutch Cover and Release Mechanism



Exploded View
Clutch Assembly



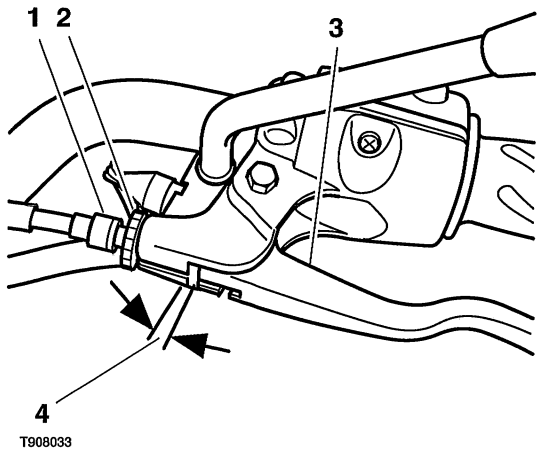
Exploded View
Starter Drive Components



CLUTCH CABLE

Adjustment

1. Clutch cable adjustment is checked by measuring the amount of freeplay at the lever. Adjustment is correct when 2-3 mm of freeplay is present between the clutch lever and its mounting bracket.



1. Upper adjuster

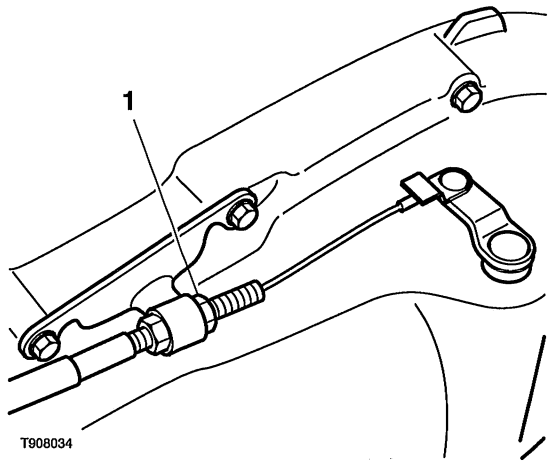
2. Adjuster Locknut

3. Lever

4. Freeplay measurement

2. To adjust the cable, slacken the locknut and rotate the upper adjuster. Once the freeplay setting is correct, securely tighten the locknut.

3. If there is insufficient adjustment available, screw the upper adjuster fully into the bracket then slacken the lower adjuster locknut. Position the lower adjuster nut so that all but a small amount of freeplay is removed from the cable then securely tighten the locknut. Carry out final adjustment with the upper adjuster.



1. Lower adjuster

Removal

1. Slacken the locknut and screw the upper adjuster fully into the lever mounting bracket.

2. Slacken the lower adjuster locknut and back off the adjuster nut to give maximum freeplay in the cable.

3. Free the inner cable from the release arm then free the outer cable from its mounting bracket.

4. Align the slots in the upper adjuster and locknut then detach the cable from the handlebar lever.

5. Note the correct routing of the clutch cable then free the cable from its retaining clips and remove it from the motorcycle.

Inspection

1. Check the inner cable for free movement through the outer cable.

2. Examine the inner cable for damage, fraying etc.

3. Examine the two inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

Installation

1. Fit the cable to the motorcycle. Ensure the cable is correctly routed and retained by all the necessary clips as noted during removal.

2. Connect the inner cable to the handlebar lever and seat the outer cable in the upper adjuster.

3. Locate the lower end of the outer cable in its mounting bracket and attach the inner cable to the release lever arm.

4. Ensure the upper adjuster is screwed fully into the lever mounting bracket.

5. Rotate the lower adjuster nut until only a small amount of freeplay is present in the cable then securely tighten the locknut.

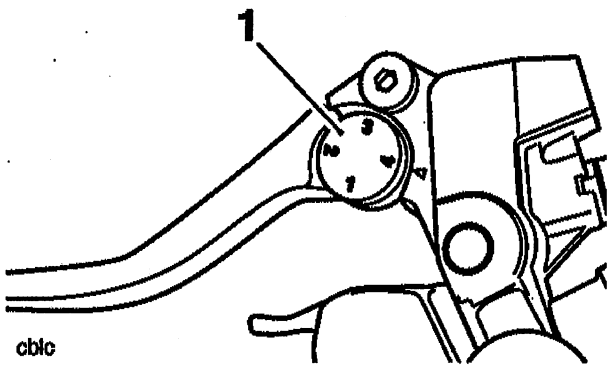
6. Operate the clutch lever several times to settle the cable in position then adjust the cable freeplay using the upper adjuster (see adjustment).

CLUTCH LEVER ADJUSTER

On Thruxton and Scrambler models an adjuster is fitted to the clutch lever. The adjusters allow the distance from the handlebar to the lever to be changed to one of four positions, to suit the span of the operator's hands.

To adjust the lever, push the lever forward and turn the adjuster wheel to align one of the numbered positions with the triangular mark on the lever pivot (seen aligned with position 4 below).

The distance from the hand grip to the released lever is shortest when set to number four and longest when set to number one.



1. Adjuster wheel

CLUTCH COVER

Removal

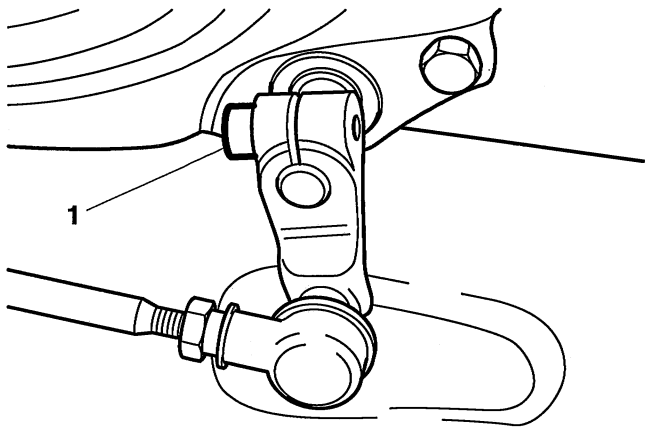
WARNING: Ensure the motorcycle is stabilised and adequately supported, to prevent it falling and causing damage or injury.

1. Position the motorcycle on its side stand.

2. Disconnect the battery, negative (black) terminal first.

3. Drain the engine oil (see lubrication section). Once the oil has drained refit the sump plug, with a **new** sealing washer and torque to **25 Nm.**

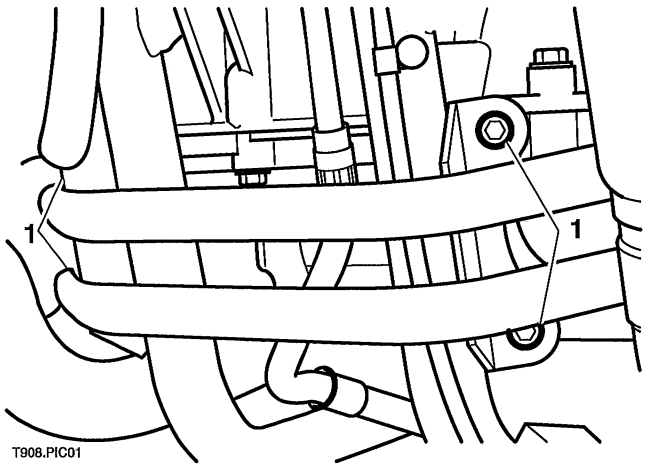
4. Note the position of the gear change lever on its shaft then unscrew the clamp bolt and remove the lever.



1. America & Speedmaster gear change lever

5. On America & Speedmaster only, remove the left hand silencer as described in the fuel system section.

6. On America & Speedmaster only, release the foot control mounting bar from the frame. Manouvre the bar assembly into a space above its mounting point such that it will allow the clutch cover to be removed. Cable-tie the bar in place.



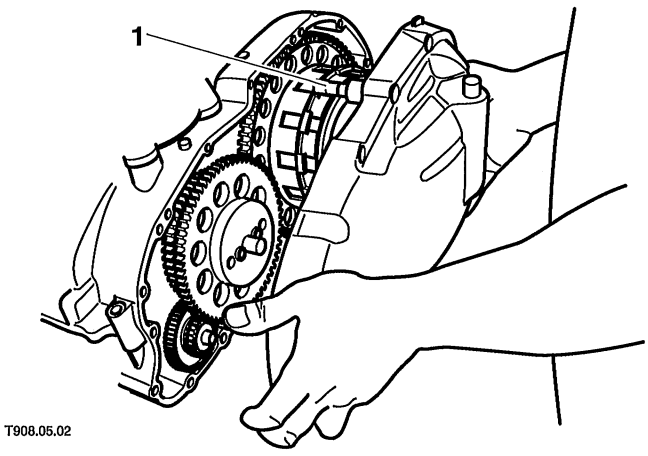
1. Mounting bar fixings

7. Detach the lower end of the clutch cable from the release arm (see clutch cable removal).

8. Disconnect the crankcase breather hose from its union on the top of the crankcase.

9. Slacken and remove the clutch cover retaining bolts along with the cable mounting bracket.

10. Remove the clutch cover, freeing the breather pipe from the top of the crankcase (up to engine number 221607 only). Take care not to lose the cover locating dowels or the washer from the starter idler gear shaft.

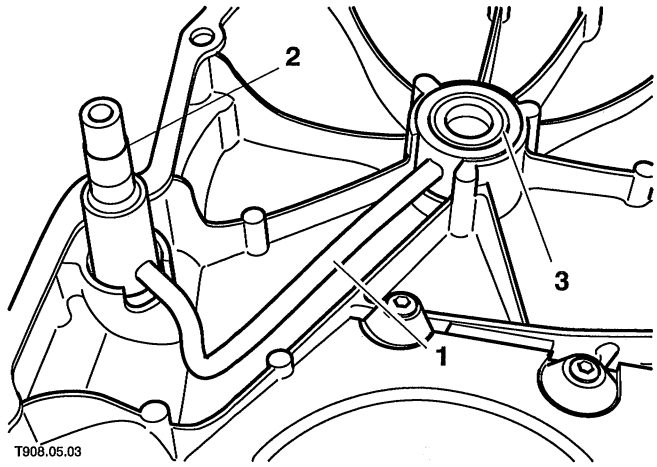


1. Breather pipe

11. Remove the clutch cover gasket and discard it.

Inspection

1. Up to engine number 221607 only - Inspect the crankcase breather pipe seal and O-ring for damage and, if necessary, renew. Ensure the new seal is fitted the correct way around with its sealing lip facing inwards (towards the pipe).



1. Breather pipe

2. O-ring

3. Seal

2. All models - Inspect the gearchange shaft needle roller bearing and oil seal for signs of wear or damage and, if necessary, renew. Ensure the new seal is fitted the correct way around with its sealing lip facing inwards.

Installation

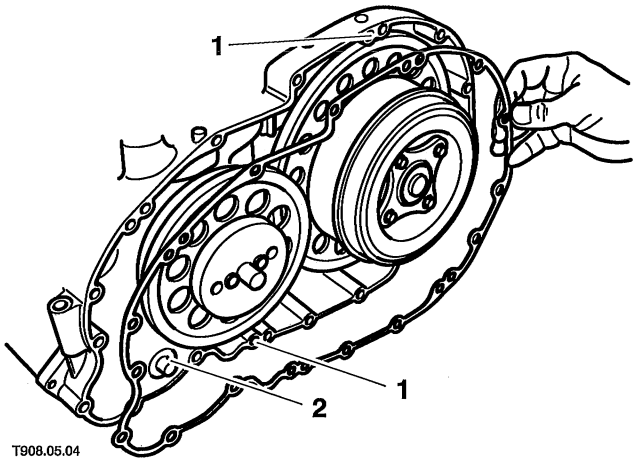
1. Ensure the clutch cover and crankcase mating surfaces are clean and dry.

2. Check the clutch release mechanism components are correctly installed.

3. Ensure the washer is in position on the starter idler gear shaft.

4. If fitted, lubricate the breather pipe oil seal lip and O-ring and the gearchange shaft oil seal lip with a smear of clean engine oil then carefully fit the clutch cover.

5. Fit a **new** clutch cover gasket ensuring that the locating dowels are correctly in place.



T908.05.04

1. Locating dowels

2. Idler gear washer

NOTE:

- **Keep the clutch cover square to the crankcase as it is fitted to avoid damaging the breather pipe seal. Great care must also be taken not to damage the oil seal on the gearchange shaft splines.**

6. Install the clutch cover bolts in their original locations, ensuring the clutch cable mounting bracket is correctly positioned. Tighten all bolts hand-tight then go around and tighten them to:
   9 Nm (except Speedmaster)
   12 Nm (Speedmaster).

7. Reconnect the crankcase breather hose securely to the breather pipe.

8. Reconnect the clutch cable to the release arm.

9. Position the gearchange lever as was noted prior to removal and fit it to the shaft. Tighten the gearchange lever clamp bolt to **9 Nm**.

10. On America & Speedmaster only Refit the foot control mounting bar, tightening the fixings to **30 Nm**.

11. On America & Speedmaster only Refit the left hand silencer as described in the fuel system section.

12. Fill the engine with the correct grade and type of engine oil (see lubrication section).

13. Reconnect the battery, connecting the positive (+) terminal first, then fit the seat.

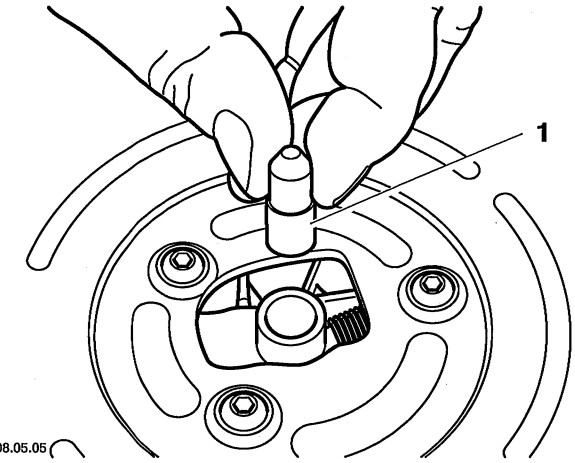
14. On America & Speedmaster only Ensure the rear brake functions correctly after disturbing the foot control mounting bar.

CLUTCH RELEASE MECHANISM

Removal

1. Remove the clutch cover.

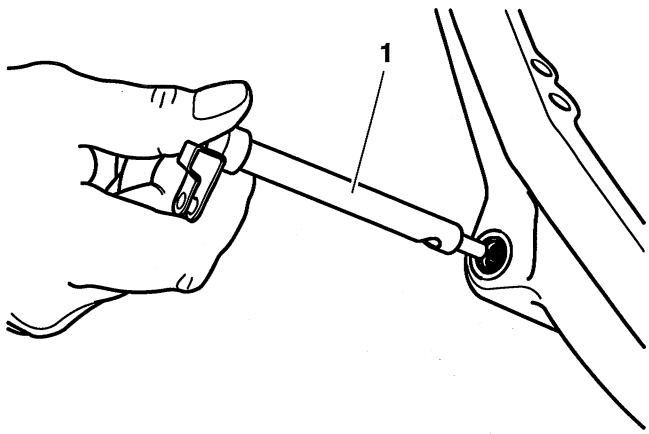
2. Withdraw the pushrod from the clutch cover, noting which way around it is fitted.



T908.05.05

1. Pushrod

3. Withdraw the release arm from the clutch cover and recover its return spring.



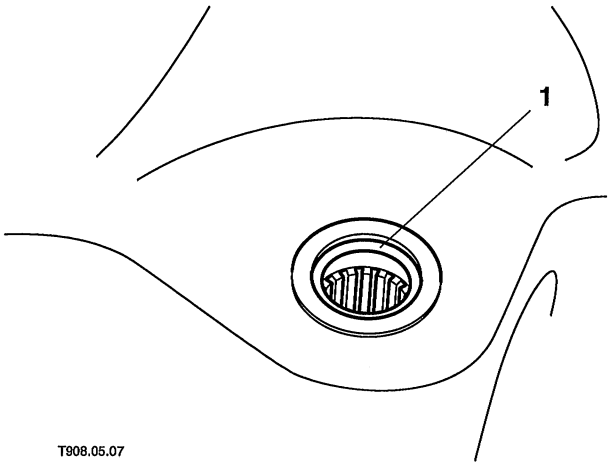
T908.05.06

1. Release arm

Inspection

1. Inspect the release arm seal for signs of damage and, if necessary, renew. Carefully lever out the original seal and press the new seal into position, making sure its sealing lip is facing inwards.

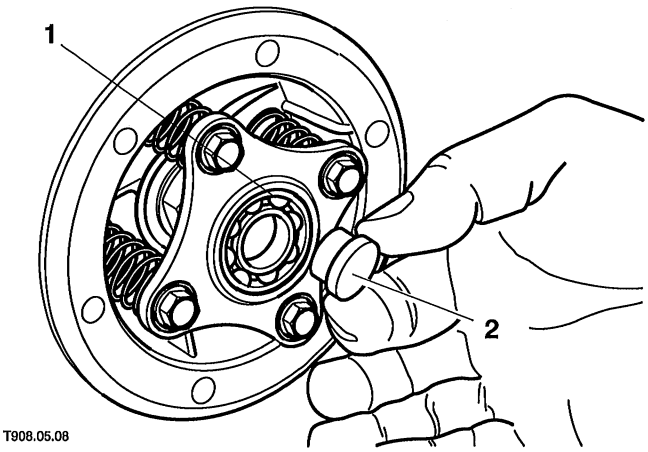
2. Inspect the release arm needle roller bearings and the arm contact surfaces for signs of wear or damage. If necessary renew both needle roller bearings and the arm.



T908.05.07

1. Release arm bearing

3. Check the pushrod seat and release bearing (fitted to the clutch release plate) for signs of wear or damage. Renew as necessary.



T908.05.08

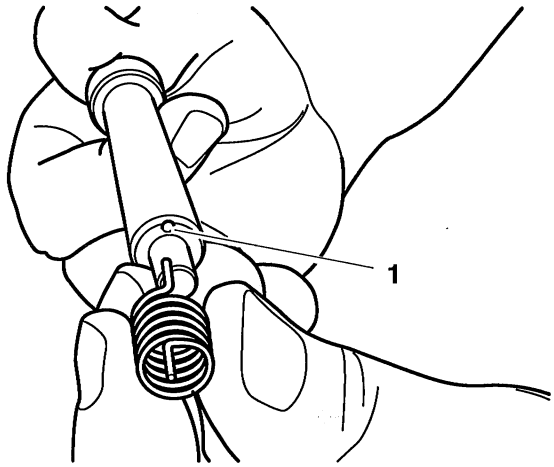
1. Release bearing

2. Pushrod seat

Installation

1. Lubricate the seal lip, the needle roller bearings and the pushrod with molybdenum disulphide grease.

2. Fit the return spring to the release arm, locating its end correctly in the arm hole.



T908.05.09

1. Release arm hole

3. Fit the release arm and spring assembly to the cover, taking care not to damage the seal lip. Ensure the return spring remains correctly fitted to the arm and align its lower end with the cover.

4. Ensure the cable fitting of the release arm is facing forwards then align the release arm shaft cutout with the cover. Insert the pushrod with its flat end facing inwards (towards the arm) and engage it with the release arm.

5. Check the operation of the release arm mechanism before installing the clutch cover.

CLUTCH

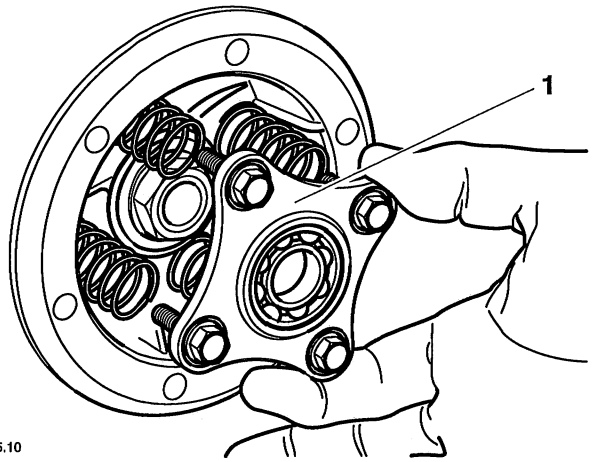
Removal

1. Remove the clutch cover.

2. If the clutch drum is being removed, remove the starter clutch driven gear.

3. Evenly and progressively slacken the four bolts securing the release plate to the clutch.

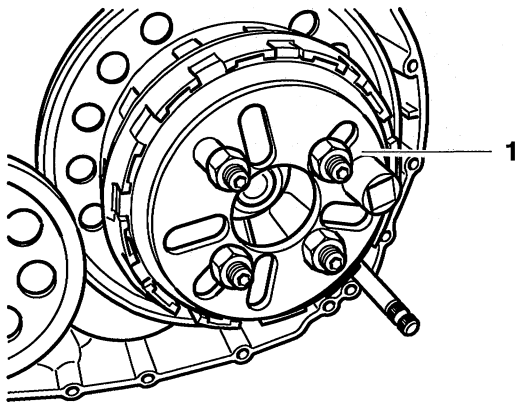
4. Remove the bolts and lift off the release plate (complete with the bearing and pushrod seat) and clutch springs.



T908.05.10

1. Release plate

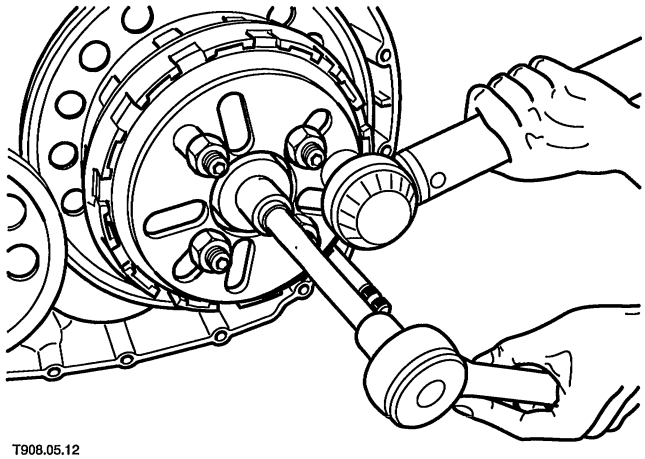
5. Fit the service tool T3880360 to the clutch centre and pressure plate assembly, tightening its four retaining screws lightly only. **Do not overtighten the service tool screws.**



T908.05.11

1. Service tool T3880360

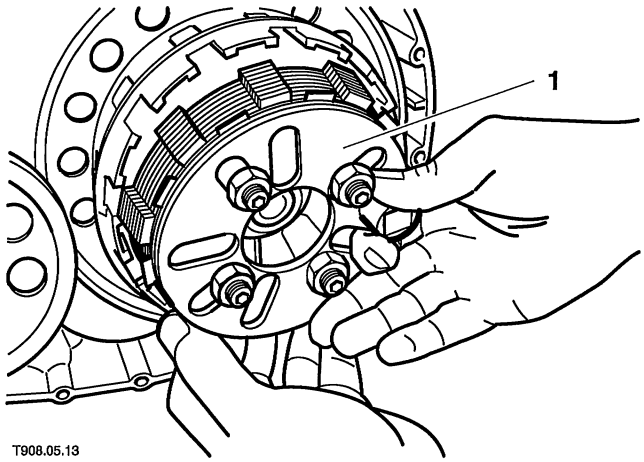
6. Hold the service tool to prevent clutch rotation then slacken and remove the centre nut and dished washer from the input shaft.



T908.05.12

Retain the service tool and slacken the centre nut

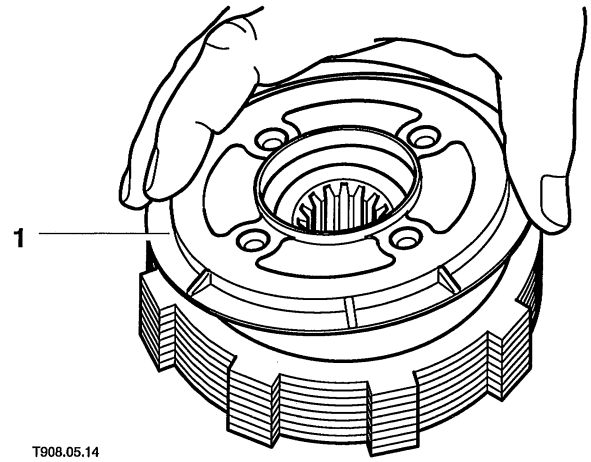
7. Withdraw the clutch centre and pressure plate assembly, complete with the service tool.



T908.05.13

1. Clutch centre and pressure plate

8. Remove the service tool then invert the assembly and lift off the pressure plate from the rear of the clutch centre.



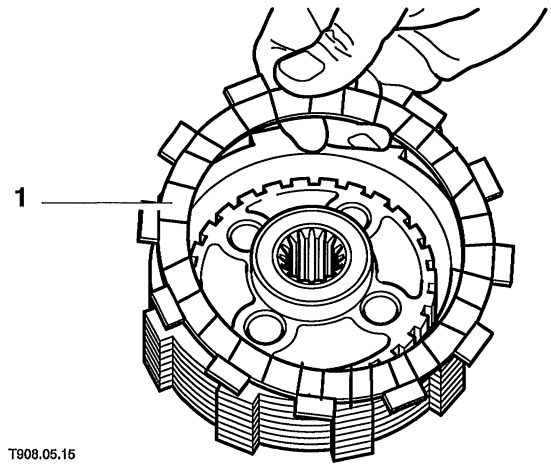
T908.05.14

1. Pressure plate

9. Noting their orientation, remove the friction plates and steel plates from the clutch centre.

NOTE:

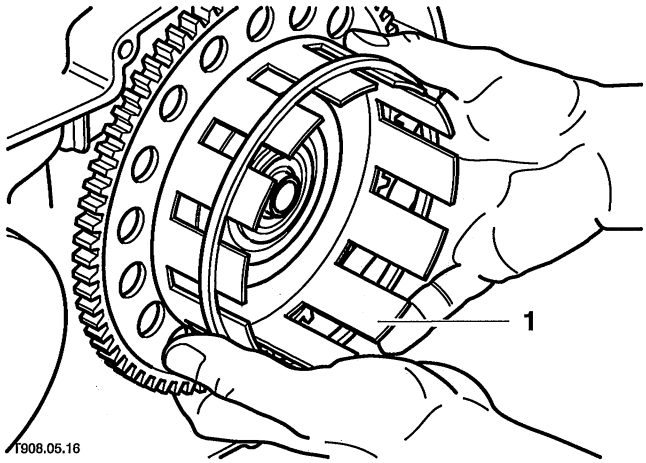
- **The innermost and outermost friction plates and outermost steel plate are different from the other plates. Store all plates in their correct fitted order to avoid confusion on installation.**



T908.05.15

1. Friction plate

10. Slide the clutch drum off the input shaft.

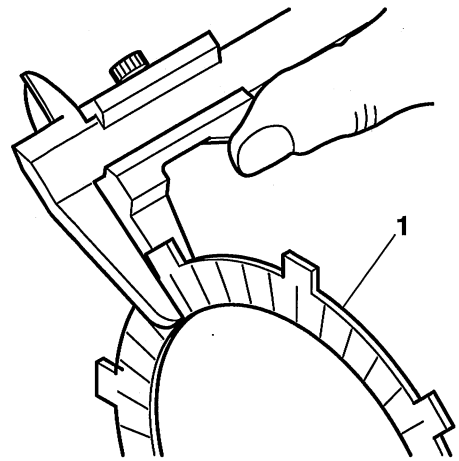


1. Clutch drum

11. Remove the oil pump drive gear and the shouldered bush from the input shaft.

Inspection

1. Check the thickness of all clutch friction plates and inspect all plates for signs of wear, damage or distortion. If any plate has signs of damage or is worn beyond the service limit, replace the friction plates as a set.

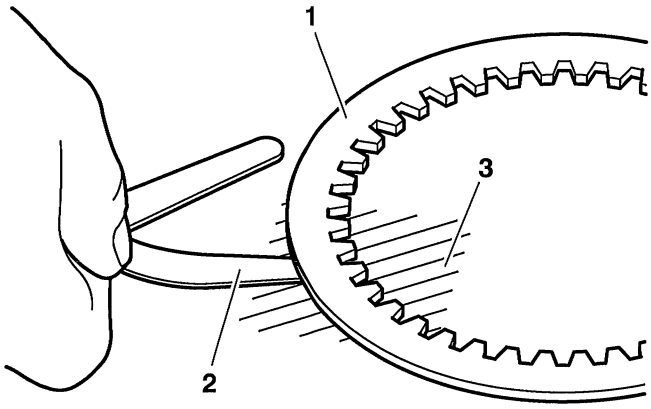


1. Friction disc

Friction plate thickness

Standard	**2.92 - 3.08 mm**
Service limit	**2.72 mm**

2. Inspect all steel plates for signs of wear or damage. Place each plate on a clean surface plate and check for warpage at several points around the clutch plate, using feeler gauges. If any plate has signs of damage or is warped beyond the service limit, replace the steel plates as a set.



04.09-1

1. Steel plate

2. Feeler gauge

3. Surface plate

Service limit	**0.15 mm warpage**

3. Inspect the grooves in the clutch centre for signs of wear or damage. Renew the clutch centre if damaged.

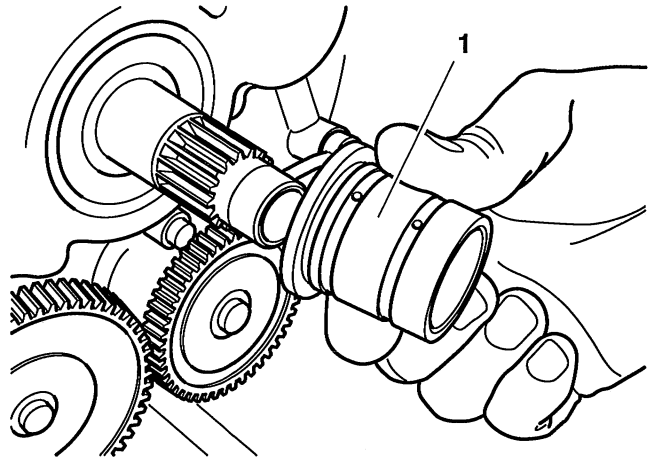
4. Inspect the clutch drum slots for signs of wear or damage. Renew the clutch drum if damaged.

5. Inspect the clutch drum needle roller bearing and shouldered bush for signs of wear or damage. If necessary, renew the bush and bearing as a set.

6. Inspect the release plate bearing for signs of wear and renew if necessary.

Installation

1. Lubricate the input shaft with clean engine oil then slide on the shouldered bush (shoulder innermost).

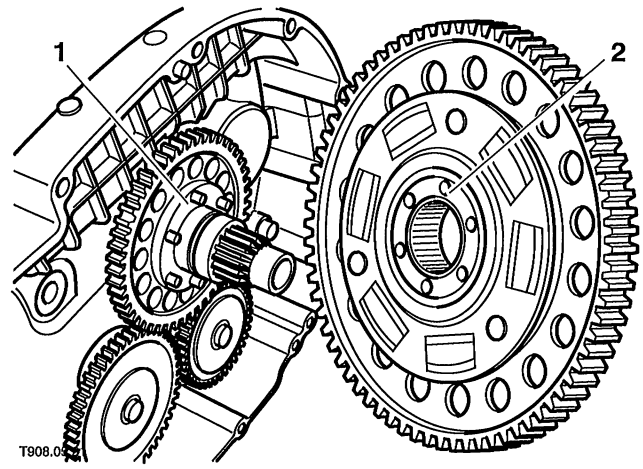


1. Shouldered bush

2. Fit the oil pump drive gear to the shouldered bush, ensuring its pegs are facing outwards. Engage the drive gear with both oil pump gears.

3. Lubricate the clutch drum needle roller bearing with clean engine oil.

4. Fit the clutch drum, engaging it with the primary drive gear. Slide the drum fully onto the shaft whilst rotating one of the oil pump gears; this will help the drum engage with the oil pump drive gear pegs.



1. Drive gear

2. Clutch drum

NOTE:

- **Ensure that the clutch drum is correctly engaged with the oil pump drive gear before proceeding.**

5. The innermost and outermost friction plates differ from the centre friction plates and the outermost steel plate differs from the other steel plates. Identification is as follows.

   a The innermost and outermost friction plates are darker in colour.

   b The outermost steel plate is darker in colour than the other steel plates.

CAUTION: Ensure the clutch plates are all installed in the correct locations. Failure to do so will adversely affect the operation of the clutch.

6. Coat all the friction and steel plates in clean engine oil.

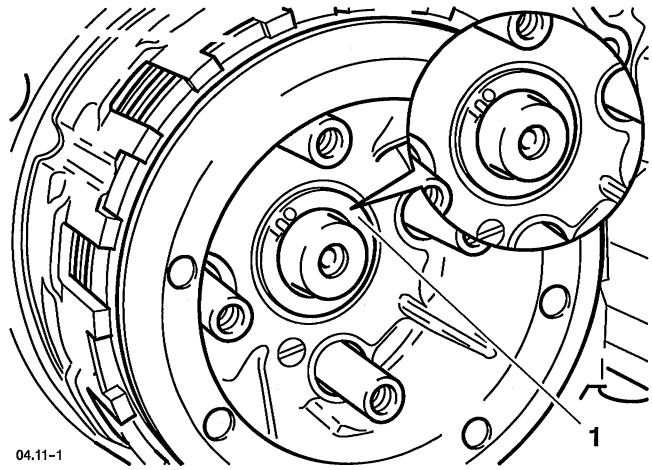
7. Fit the outermost friction plate, followed by the outermost steel plate then alternately install the remaining friction and steel plates until the innermost friction plate has been installed.

8. Fit the pressure plate ensuring it engages correctly with the clutch centre.

9. Invert the assembly and fit the service tool T3880360 to the pressure plate. Align all the friction plate tabs then lightly tighten the four service tool screws to hold them in position. **Do not overtighten the service tool screws.**

10. Fit the clutch centre and pressure plate assembly, aligning the friction plate tabs with the clutch drum slots. Align the clutch centre splines with those of the input shaft and slide the assembly fully into position.

11. Fit the dished washer with its OUT marking facing outwards.



1. Dished washer

12. Screw on the centre nut and tighten it to **105 Nm** whilst holding the service tool to prevent rotation.

13. Remove the service tool from the pressure plate.

14. Fit the clutch springs.

15. Ensure the bearing and pushrod seat are correctly installed in the release plate.

CAUTION: Always completely and accurately follow the remaining assembly sequence as failure to use tool T3880014, or incorrect use of this tool could lead to clutch/transmission problems and/or premature wear to components.

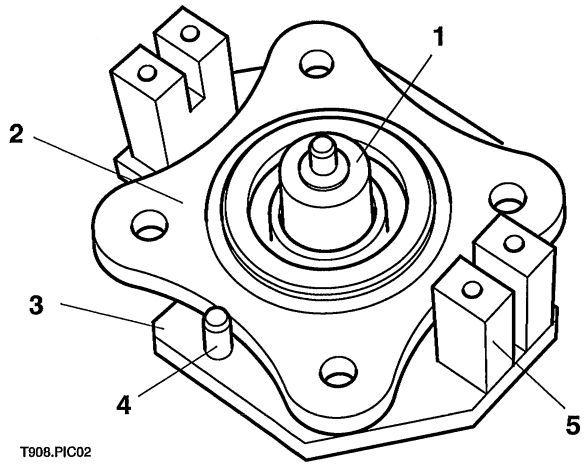
16. Locate the release plate assembly (bearing and push-rod seat facing outwards from the clutch) to the underside of tool T3880014.

NOTE:

- **There are two centralising mandrels provided with tool T3880014, one with a single tapered end, and one with two stepped ends (13mm and 14mm). Always select and use the mandrel which most closely fits the hole in the centre of the input shaft into which it will be inserted.**

- **The 13 and 14mm ends are VERY close fits in the input shaft. Always ensure you are using the correct end of the mandrel as use of the wrong end will result in transmission noise.**

17. Locate the mandrel from the tool into the centre of both the tool and release plate (tapered end first).



1. Mandrel

2. Release plate

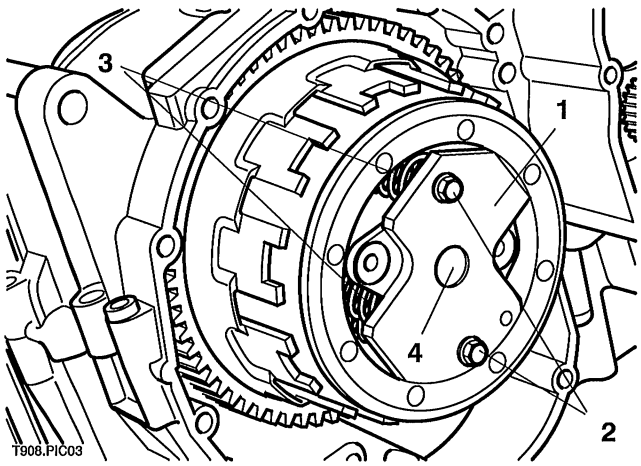
3. Tool T3880014

4. Location peg

5. Tool feet

18. Position the plate, mandrel and tool assembly to the clutch springs.

19. Introduce the two bolts supplied through the holes in the tool, through two of the clutch springs, and loosely engage the bolt threads in the clutch inner drum. Ensure that the mandrel engages in the centre of the input shaft.



1. Tool T3880014

2. Bolts

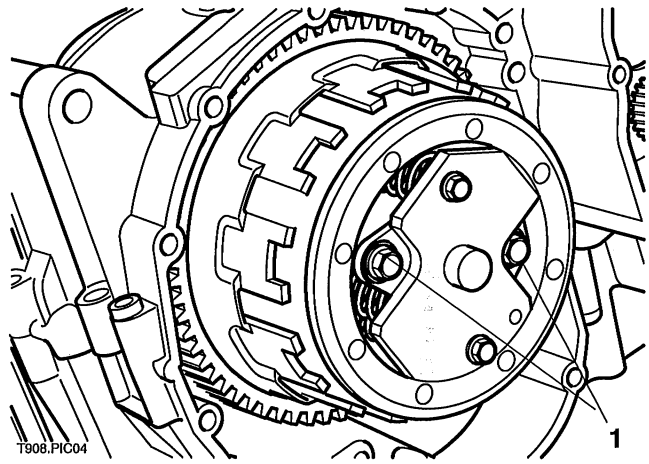
3. Clutch springs

4. Mandrel

20. Locate and engage two of the original release plate bolts in the two release plate bolt locations exposed by the tool.

21. Evenly and progressively tighten the two bolts engaged through the tool and release plate ensuring the following;-

- that the feet of the tool align and engage with two of the webs in the clutch inner drum,
- that the mandrel remains squarely and centrally located in the tool, release plate and input shaft,
- that the location peg on the tool is located against the edge of the release plate.



1. Bolt locations

22. With the tool and release plate held securely, tighten the two bolts not engaged through the tool to **9 Nm.**

23. Remove the tool and mandrel leaving the release plate securely held.

24. Refit the original release plate bolts to the two remaining holes and tighten to **9 Nm.**

25. Refit the starter driven gear.

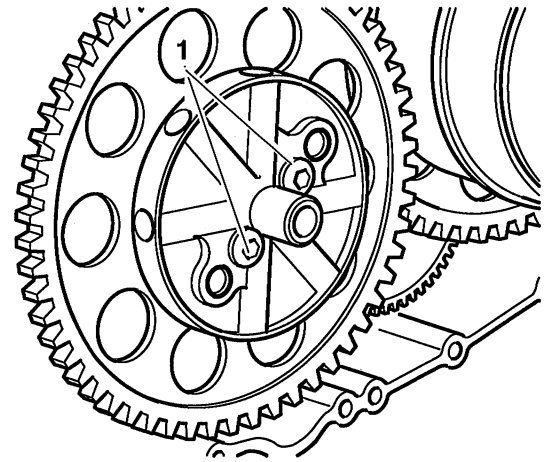
26. Refit the clutch cover.

STARTER DRIVE

Removal

1. Remove the clutch cover.

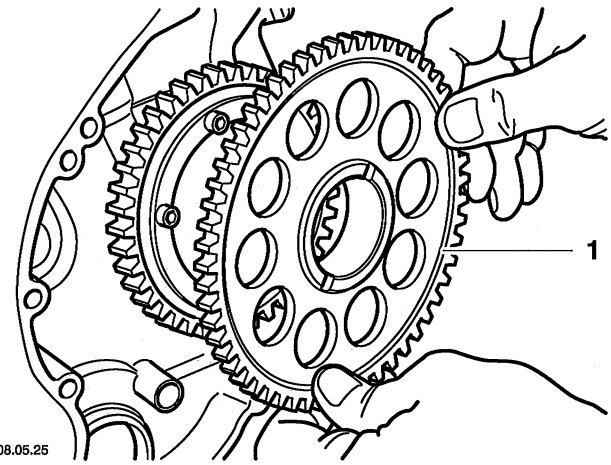
2. Up to Engine number 221608 only - Slacken and remove the retaining screws and remove the centrifugal breather and its spacer plate from the crankshaft. Discard the screws.



T908.05.24

1. Centrifugal breather screws

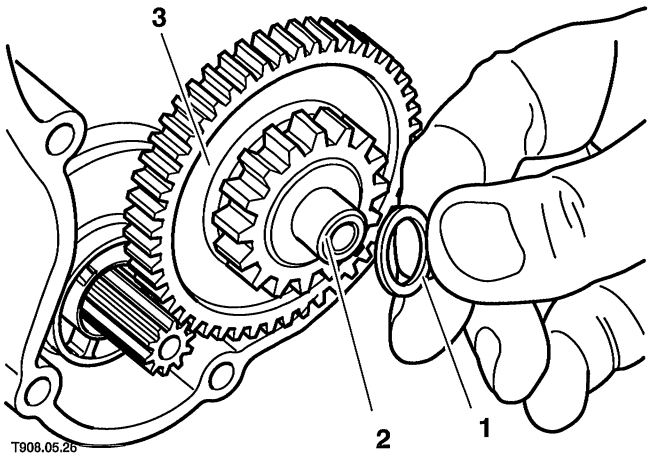
3. All engines - Rotate the driven gear in a clockwise direction and withdraw it from the end of the crankshaft.



T908.05.25

1. Driven gear

4. Remove the wavey washer from the idler gear shaft then remove the shaft and idler gear.

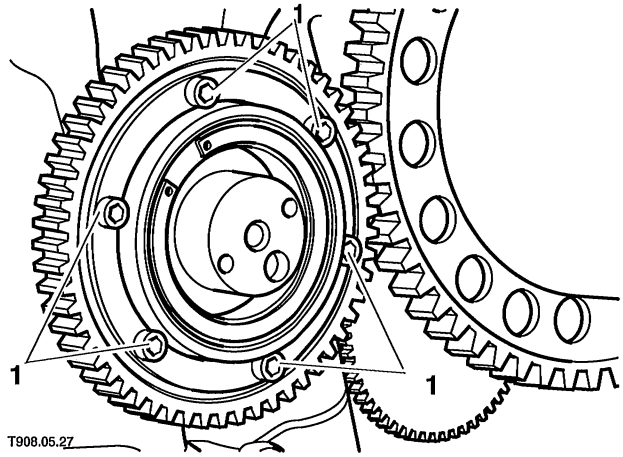


1. Washer

2. Shaft

3. Idler gear

5. Evenly and progressively slacken and remove the bolts and remove the sprag clutch housing assembly. Discard the bolts.



1. Sprag clutch housing bolts

6. Separate the sprag clutch and housing.

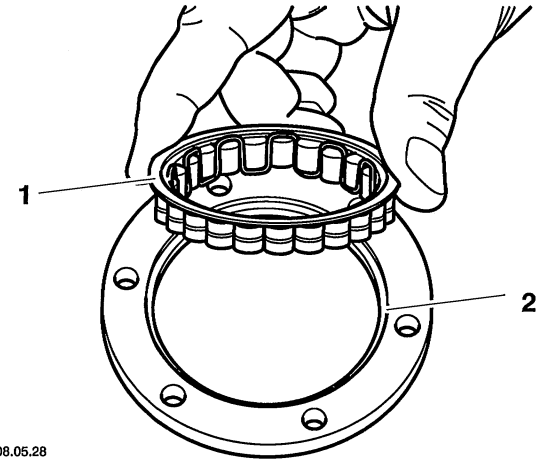
Inspection

1. Check the sprag clutch rollers for overheating, wear and/or non-smooth operation. Renew the sprag clutch if overheating, wear and/or non-smooth operation is found.

2. Check the driven gear and idler gears for signs of wear or damage, paying particular attention to the sprag clutch bearing surface of the driven gear. Renew any worn components.

Installation

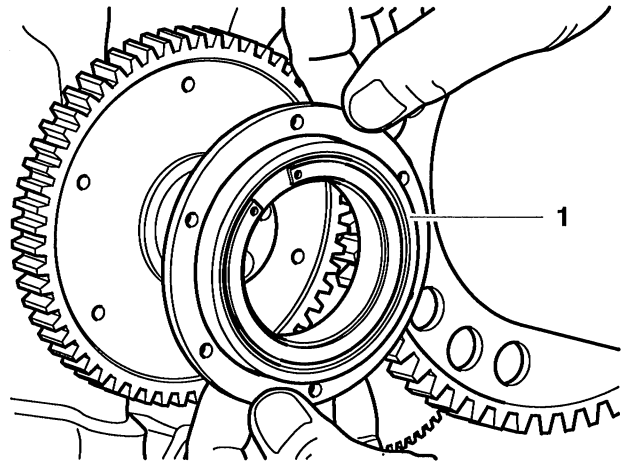
1. Fit the sprag clutch to the rear of the housing. Push the clutch firmly into the housing until its lip is correctly seated in the housing recess.



1. Sprag clutch lip

2. Housing recess

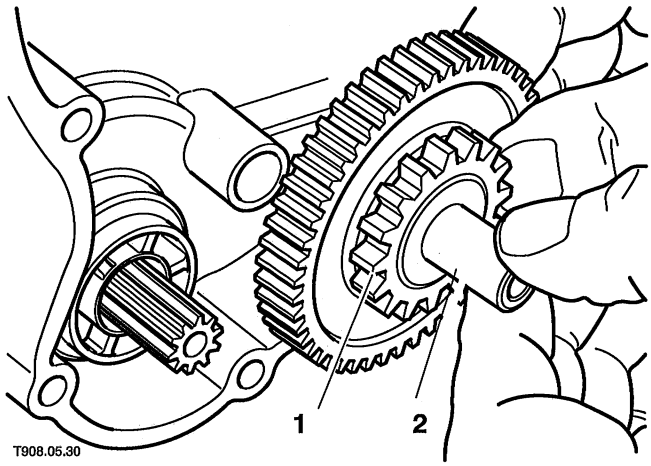
2. Ensure the mating surfaces are clean and dry then fit the housing assembly to the crankshaft. Fit the **new** bolts, tightening them evenly and progressively to **16 Nm**.



1. Housing assembly

3. Lubricate the sprag clutch and crankshaft end with clean engine oil.

4. Install the idler gear and shaft then fit the wavey washer.



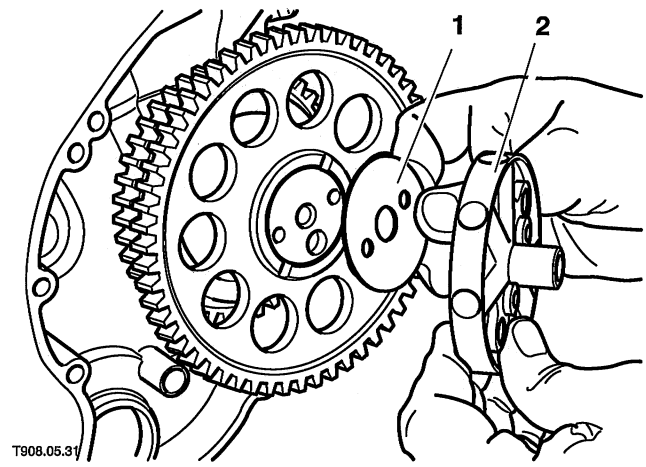
1. Idler gear

2. Shaft

5. Fit the starter driven gear ensuring it engages correctly with the idler gear.

6. Check the operation of the starter clutch before proceeding. The driven gear should rotate freely in a clockwise direction but lock firmly when anti-clockwise rotation is attempted.

7. Up to engine number 221608 only - Fit the spacer plate and centrifugal breather to the crankshaft. Fit the **new** retaining screws and tighten to **12 Nm**.



1. Spacer plate

2. Centrifugal breather

8. All engines - Install the clutch cover.

CRANKSHAFT/RODS/BALANCERS

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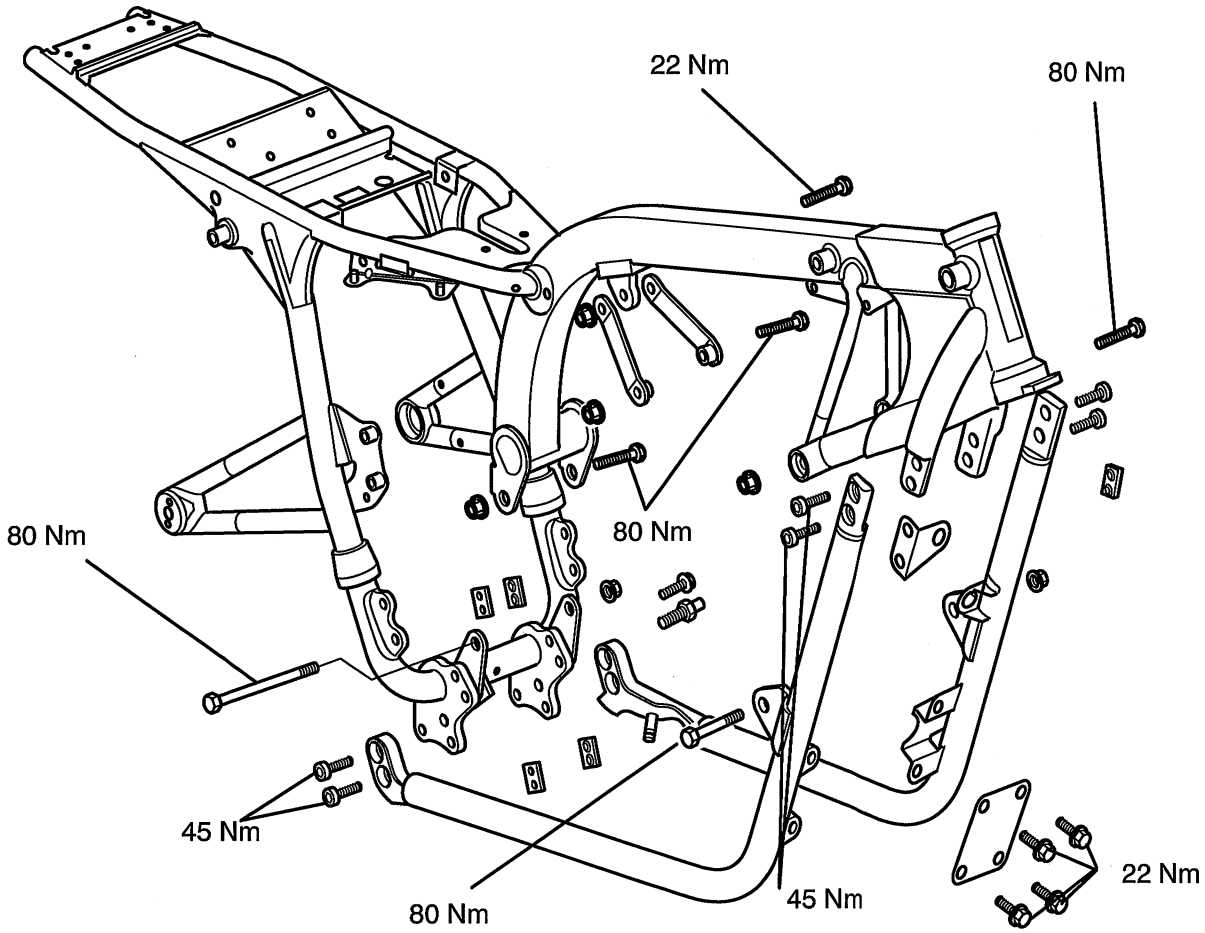
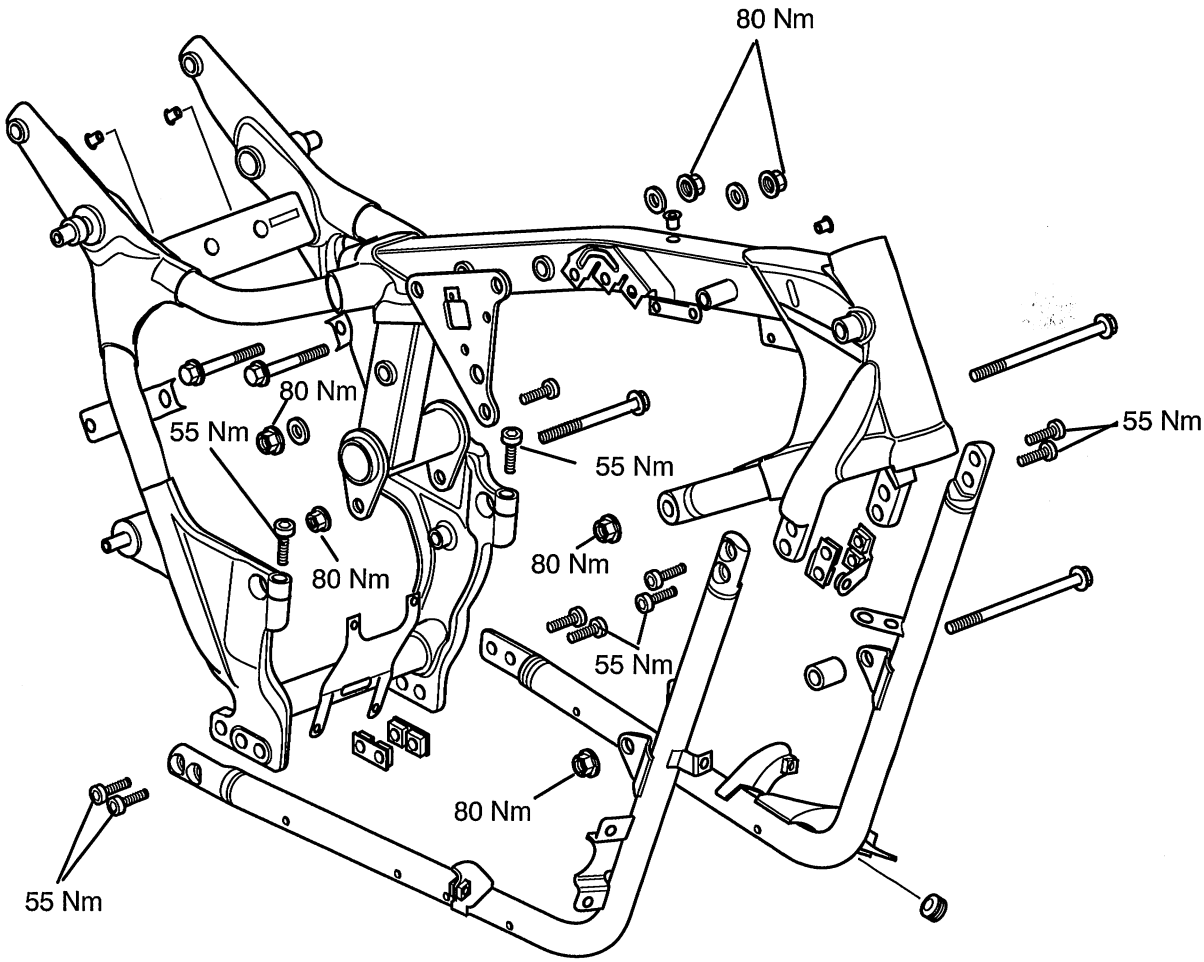
Exploded View

Engine Mountings - Bonneville, Bonneville T100, Scrambler & Thruxton



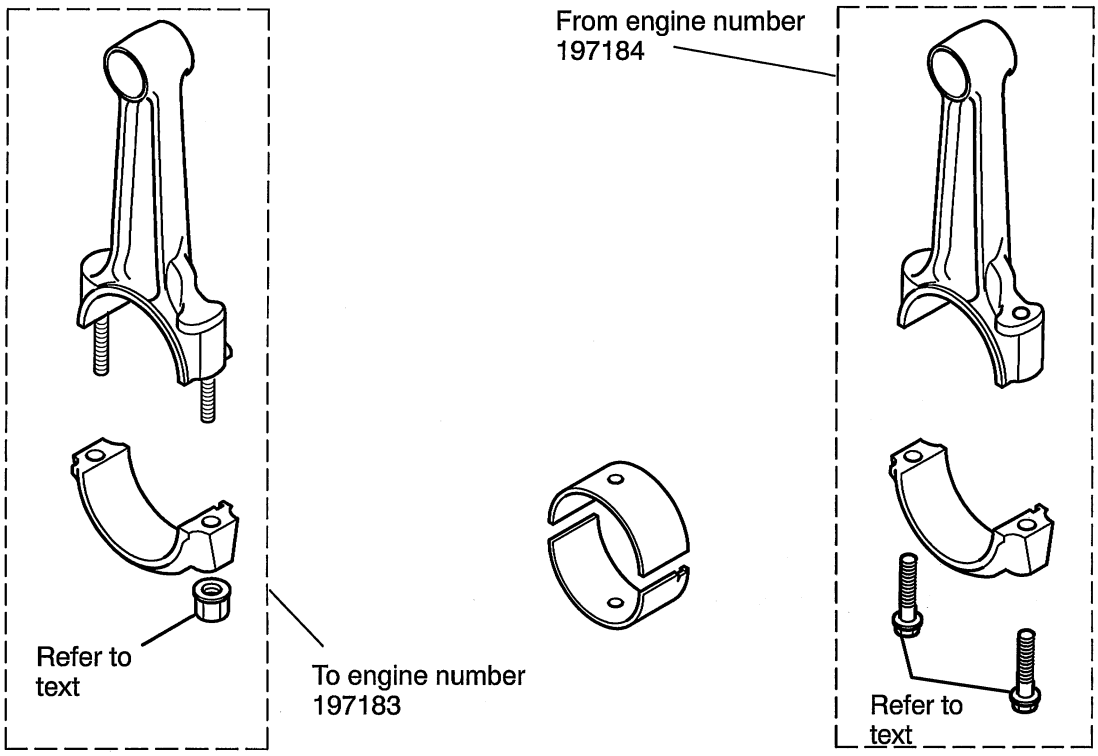
Exploded View

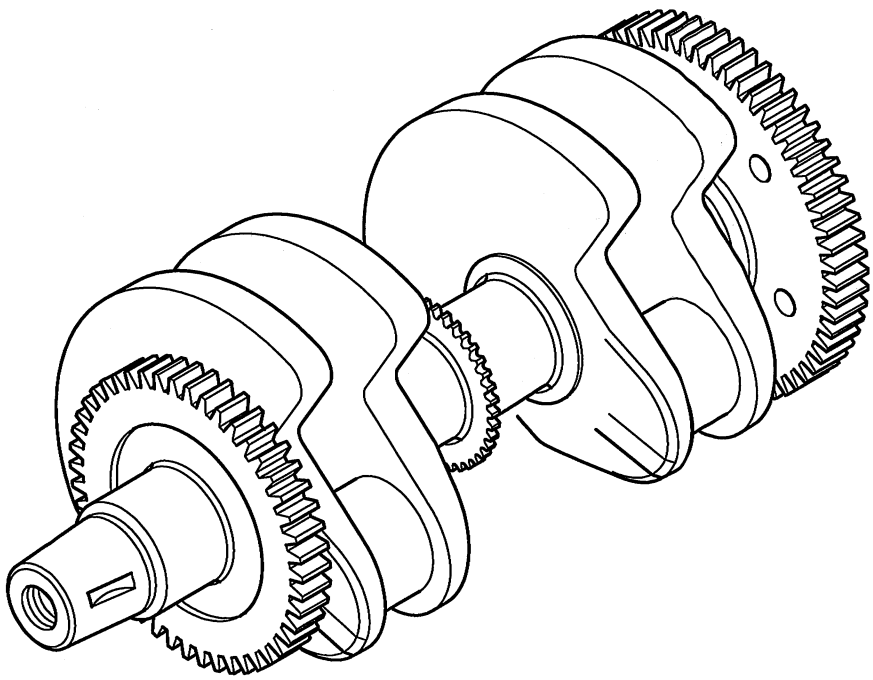
Engine Mountings - America & Speedmaster



Exploded View

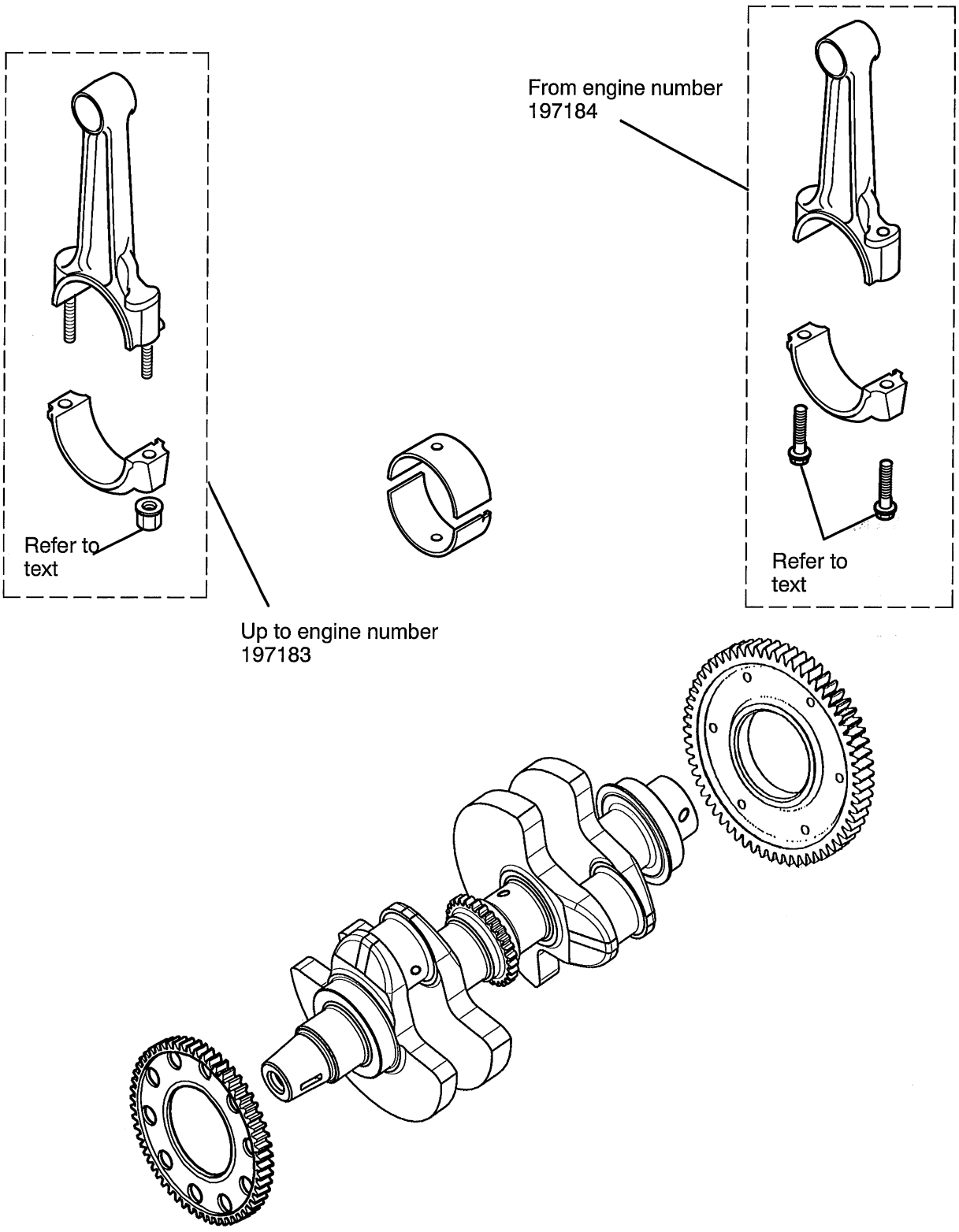
Crankshaft and Connecting Rods - Bonneville, Bonneville T100 & Thruxton





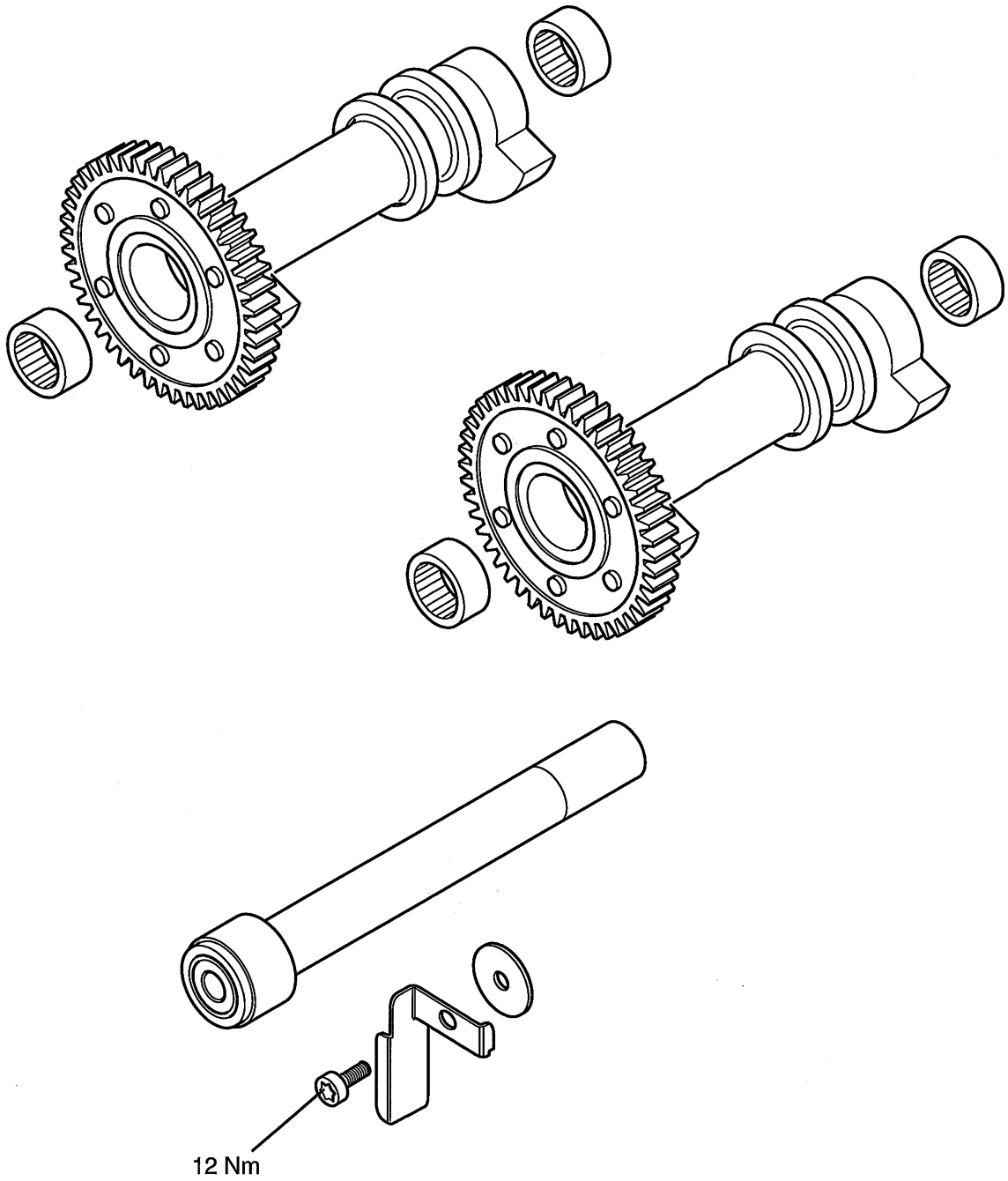
Exploded View

Crankshaft and Connecting Rods - America, Scrambler & Speedmaster



Exploded View

Balancers - All models



ENGINE - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

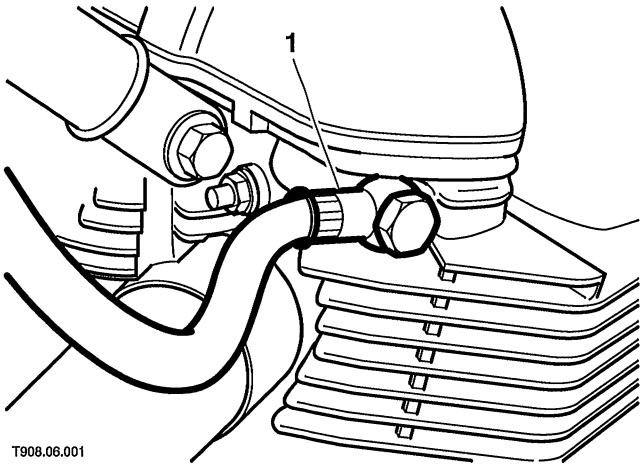
Removal

> **WARNING: Ensure that the motorcycle is stabilised and adequately supported to prevent the risk of personal injury from the motorcycle falling.**

Carry out the following:

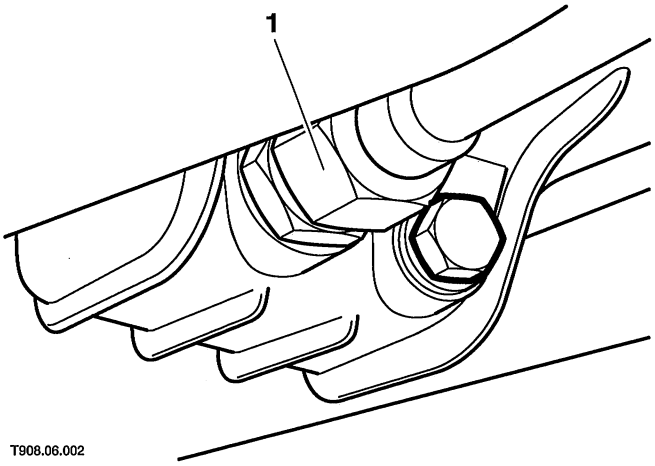
- Remove seat.
- Disconnect battery, disconnecting the negative (-) terminal first.
- Remove fuel tank, exhaust system and carburettors (see fuel system & exhaust section).
- Remove the front sprocket (see final drive section).
- Remove the swinging arm (see rear suspension section).
- Remove the evaporative canisters (California only).

1. Drain the engine oil (see lubrication system section). Once the oil has drained refit the sump plug, with a new sealing washer and torque to **25 Nm.**
2. Disconnect the spark plug caps from the plugs.
3. Remove the hoses connecting the secondary air system valve to the unions on the cylinder head.
4. Unscrew the banjo bolts securing the oil cooler feed pipes to the cylinder head. Discard the sealing washers.



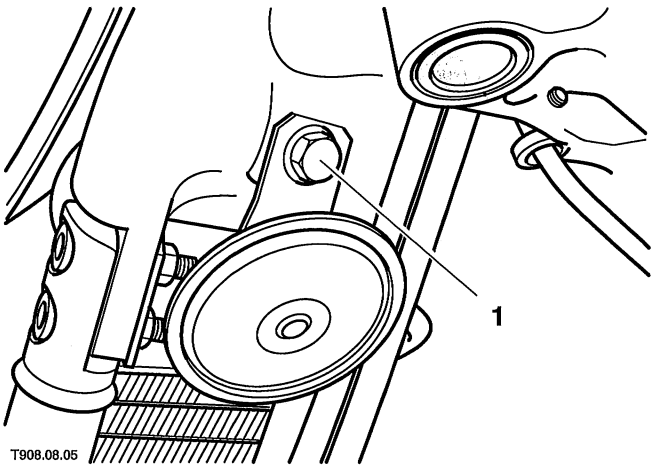
1. Oil cooler pipe connection (Bonneville shown)

5. Detach the oil cooler pipe from its connection with the sump. Discard the sealing washers if fitted.



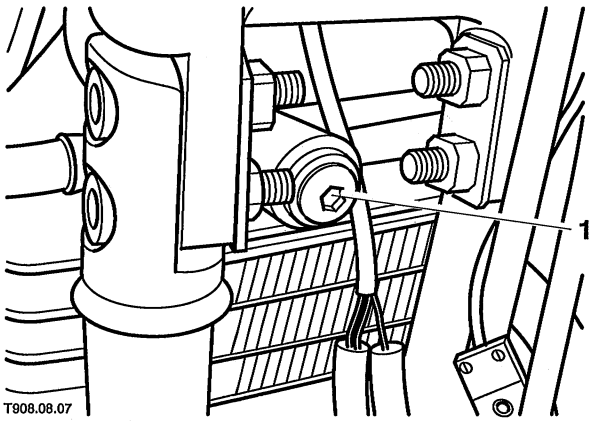
1. Oil cooler return pipe banjo bolt

6. Unbolt the horn bracket from the frame and remove the horn, disconnect its wiring.

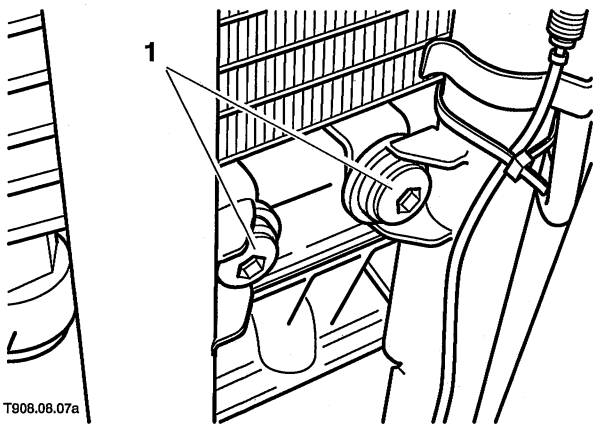


1. Horn bracket bolt

7. Unscrew the oil cooler mounting screws then remove the oil cooler, complete with its hoses. Take care not to lose the collars from the cooler rubber mountings.

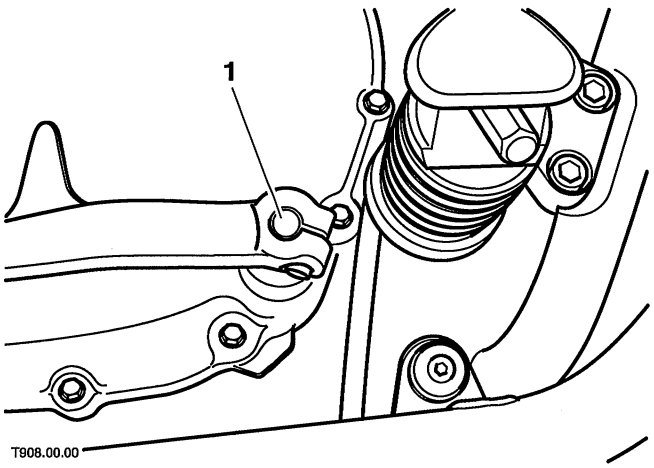


1. Oil cooler upper mounting screw



1. Oil cooler lower mounting screws

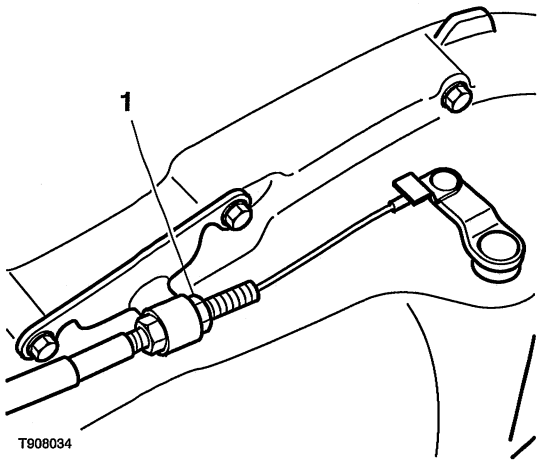
8. Note the position of the gearchange pedal/lever on its shaft then unscrew the clamp bolt and remove the pedal/lever.



1. Gearchange shaft (Bonneville)

9. Slacken the locknut and screw the clutch cable upper adjuster fully into the lever mounting bracket.

10. Slacken the clutch cable lower adjuster locknut and back off the adjuster nut to give maximum freeplay in the cable.



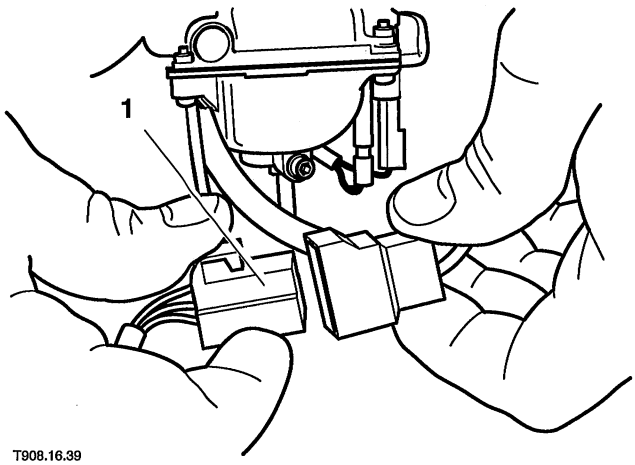
1. Clutch cable lower adjuster

11. Free the clutch inner cable from the release arm then free the outer cable from its mounting bracket.

12. Disconnect the breather hose from the top of the crankcase.

13. Disconnect the following electrical connections from the engine:

- Alternator
- Low oil pressure warning light switch
- Ignition pick-up coil
- Neutral light switch
- Earth lead



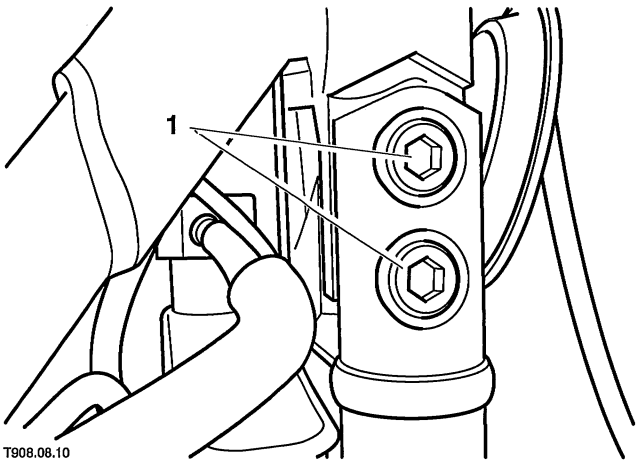
1. Alternator wiring connector

14. Unscrew the nut and detach the cable from the starter motor. Release the starter motor cable from the frame right downtube, noting its correct routing.

15. Unscrew the nut and remove the front lower engine mounting bolt.

16. Loosen the bolts securing the brace to the front of both downtubes.

17. Unscrew the bolts (there are 8 in total) securing the downtubes to the frame. Recover the nut plate from each pair of bolts noting the correct location of the oil cooler bracket.



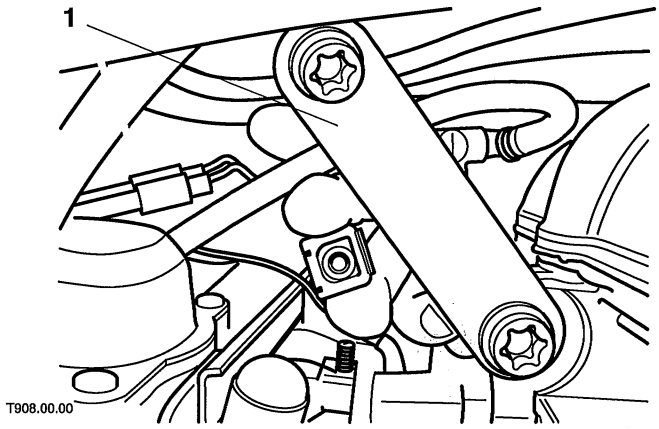
1. Downtube to frame bolts

18. Remove the bolts and manoeuvre the downtube assembly away from the frame.

19. Place a support beneath the engine and ensure that the motorcycle is still adequately and securely supported.

WARNING: Ensure both the frame and engine are securely supported before proceeding to prevent the risk of personal injury.

20. Unscrew the nuts securing the mounting brackets to the rear of the cylinder head and the frame. Withdraw the bolts and remove both brackets.



1. Mounting bracket

21. Unscrew the nut and withdraw the front upper engine mounting bolt from the cylinder head.

22. Unscrew the nuts and withdraw the rear upper and lower engine mounting bolts.

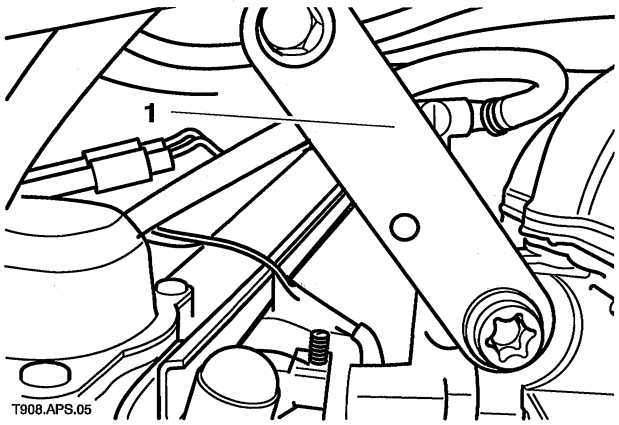
23. Lower the engine and release the earth cable from the rear.

24. With the aid of an assistant, manoeuvre the engine out from the frame.

Installation

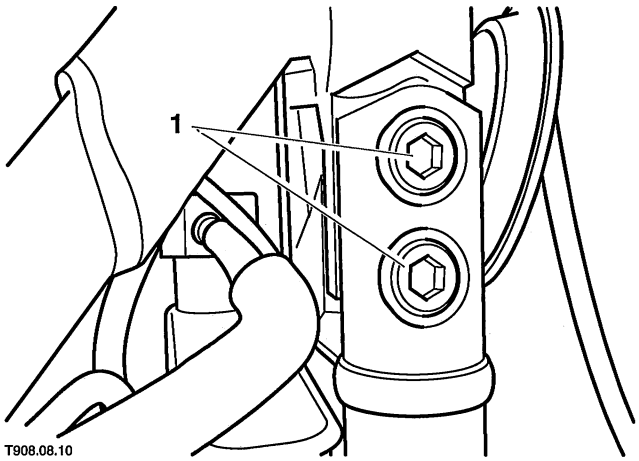
WARNING: Ensure that the motorcycle is stabilised and adequately supported to prevent the risk of personal injury from the motorcycle falling.

1. Position the engine beneath the frame.
2. With the aid of an assistant, align the engine with its mountings and fit the rear upper and lower mounting bolts, from the right-hand side. Fit the nuts to the bolts, tightening them hand-tight only.
3. Fit the front upper engine mounting bolt from the right-hand side and hand-tighten its nut.
4. Refit the cylinder head to frame mounting brackets and fit the bolts and nuts, tightening them hand-tight only.



1. Cylinder head to frame mounting bracket

5. Refit the downtube assembly and insert its mounting bolts. Fit the nut plates to the bolts, ensuring the oil cooler mounting bracket is correctly positioned, and hand-tighten all bolts.



1. Downtube to frame bolts

6. Insert the engine front lower mounting bolt from the right-hand side and hand-tighten its nut.
7. Tighten the engine mounting bolts to the specified torque in the following order.
   a. Tighten the frame downtube bolts to **45 Nm.**
   b. Tighten the rear upper and lower bolts to **80 Nm.**
   c. Tighten the front upper and lower bolts to **80 Nm.**
   d. Tighten the bolt securing the mounting brackets to the cylinder head to **80 Nm** and the bolt securing the brackets to the frame to **22 Nm.**
   e. Tighten the frame downtube brace bolts to **22 Nm.**

8. Ensure the starter motor cable is correctly routed and reconnect it to the motor. Tighten the terminal nut to **7 Nm**. Seat the rubber cap over the nut and secure the cable to the frame downtube.

9. Reconnect the alternator, ignition pick-up coil, low oil pressure warning light switch and neutral light wiring connectors and the earth lead. Ensure all wiring is correctly routed.

10. Reconnect the crankcase breather hose to the engine.

11. Reconnect and adjust the clutch cable (see clutch section).

12. Position the gearchange pedal/lever as was noted prior to removal and fit it to the shaft. Tighten the clamp bolt to **9 Nm**.

13. Install the swinging arm (see rear suspension section).

14. Refit the front sprocket (see final drive section).

15. Manoeuvre the oil cooler assembly into position. Ensure the collars are fitted to the mounting rubbers then fit the cooler mounting screws and tighten to **9 Nm**.

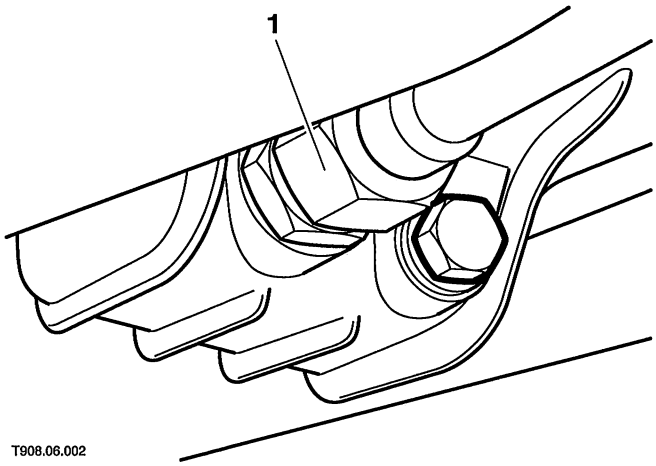
16. Position a **new** sealing washer on each side of the oil cooler feed pipe end fittings then secure the pipes to the cylinder head with the banjo bolts. Tighten the bolts to **30 Nm**.

17. Check the condition of the 'O' ring in the sump to oil cooler pipe adaptor then locate the oil cooler pipe to the union and tighten to **15 Nm** while holding the adaptor.

NOTE:

- **If a new oil cooler pipe adaptor is to be fitted, always use a new washer and tighten the adapter to 45 Nm.**

- **If a banjo union is fitted, position a new sealing washer on each side of the oil cooler pipe end fitting and fit the banjo bolt. Ensure the hose is correctly positioned then tighten the banjo bolt to 45 Nm.**



1. Oil cooler sump connection

18. Reconnect the wiring connectors to the horn then seat the horn on the frame and tighten its mounting bolt to **18 Nm**.

19. Refit the hoses connecting the secondary air valve to the unions on the cylinder head.

20. Refit the HT leads to the spark plugs.

21. Install the exhaust system, carburettors and fuel tank (see fuel system/exhaust section).

22. Fill the engine with the correct grade and type of engine oil (see lubrication section).

23. Reconnect the battery, connecting the positive (+) terminal first, then fit the seat.

ENGINE - AMERICA & SPEEDMASTER

Removal

1. Place a jack beneath the frame outriggers to support the motorcycle. Raise the rear wheel from the ground.

WARNING: Ensure that the motorcycle is stabilised and adequately supported to prevent the risk of personal injury from the motorcycle falling.

Carry out the following:

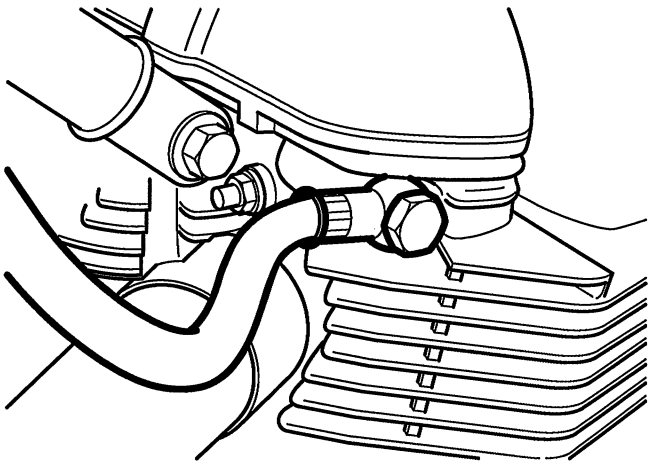
- Remove the seat.
- Disconnect the battery, negative (black) lead first.
- Remove the battery box (see electrical section).
- Remove the fuel tank.
- Remove the complete exhaust system.
- Remove the evaporative canisters (California only).

2. Drain the engine oil (see lubrication system section). Once the oil has drained refit the sump plug, with a new sealing washer and torque to **25 Nm.**

3. Disconnect the spark plug caps from the plugs.

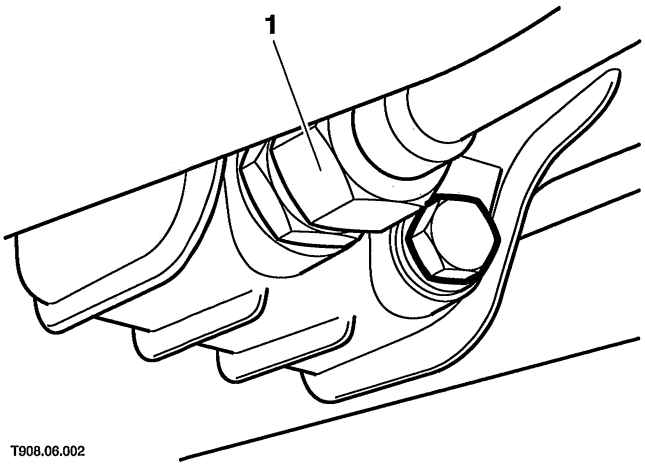
4. Remove the hoses connecting the secondary air injection control valve to the unions on the cylinder head.

5. Unscrew the banjo bolts securing the oil cooler feed pipes to the cylinder head. Discard the sealing washers.



1. Oil cooler pipe connection

6. Detach the oil cooler pipe from its connection with the sump.



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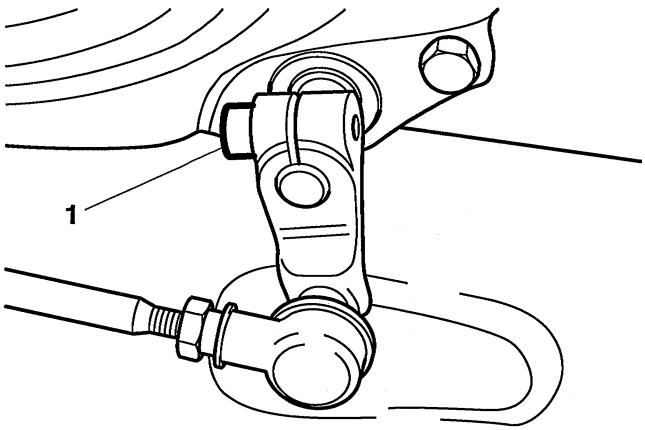
1. Oil cooler return pipe connection

7. Note the position of the gearchange lever on its shaft then unscrew the clamp bolt and remove the lever.



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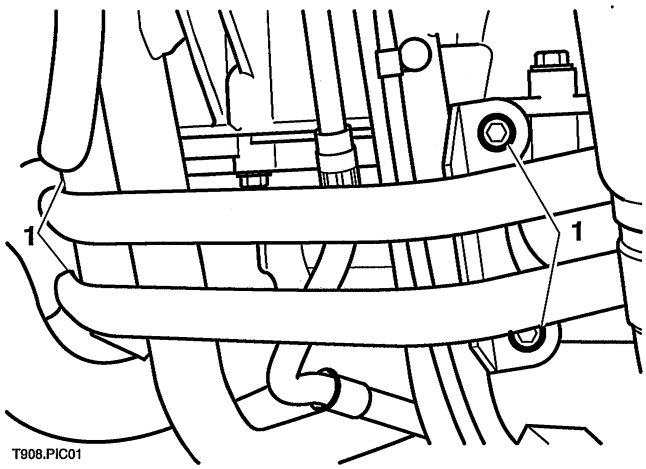
1. Gearchange shaft (Speedmaster)

8. Release the bolts securing the footrest bar to the cradle tubes.



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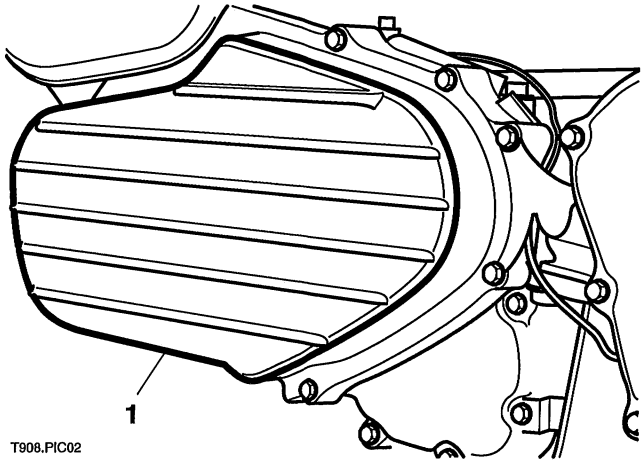
1. Footrest bar fixing locations

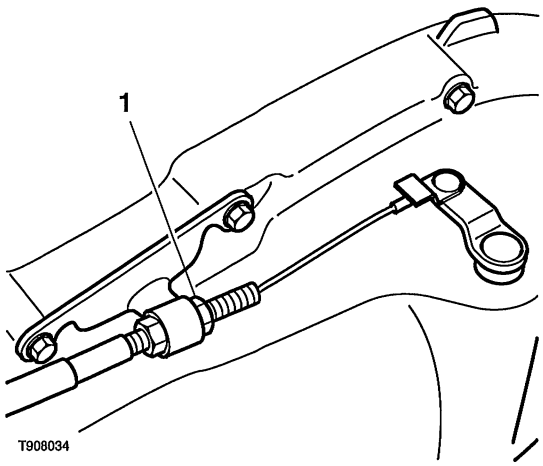
9. Remove the chain's sprocket cover.



1. Sprocket cover

10. Slacken the locknut and screw the clutch cable upper adjuster fully into the lever mounting bracket.

11. Slacken the clutch cable lower adjuster locknut and back off the adjuster nut to give maximum freeplay in the cable.



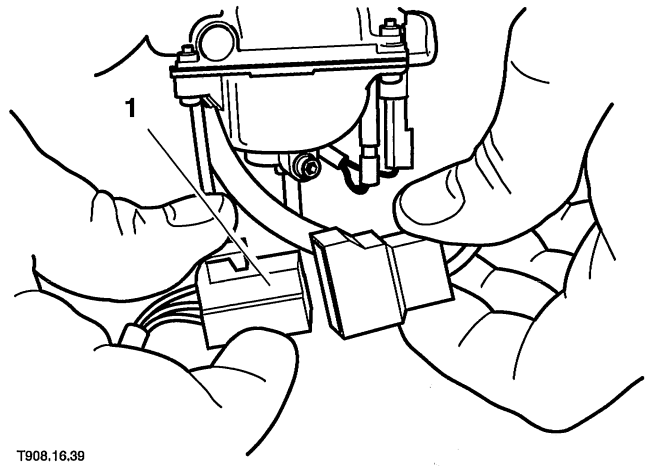
1. Clutch cable lower adjuster

12. Free the clutch inner cable from the release arm then free the outer cable from its mounting bracket.

13. Disconnect the breather hose from the top of the crankcase.

14. Disconnect the following electrical connections from the engine:

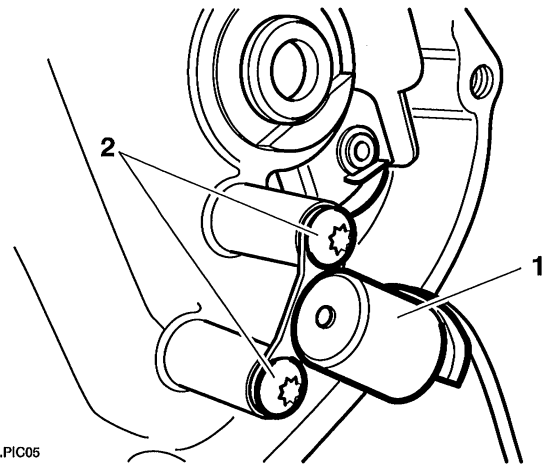
- Alternator
- Low oil pressure warning light switch
- Ignition pick-up coil
- Neutral light switch



1. Alternator wiring connector

NOTE:

- **As access to the wiring connector is difficult, some may find it easier to detach the ignition pick-up from its bracket inside the alternator cover.**

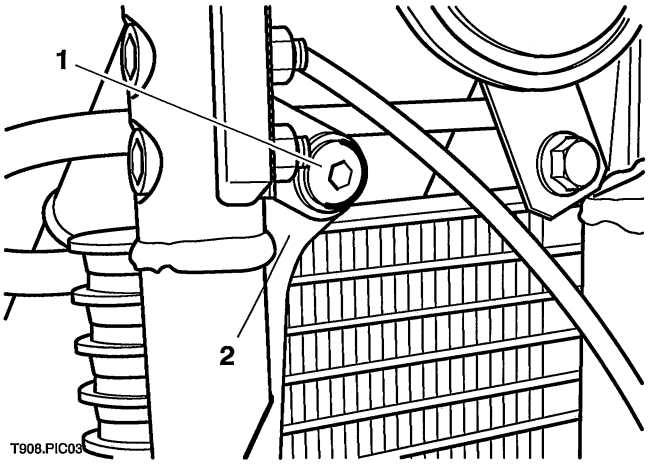


1. Ignition pick-up

2. Ignition pick-up fixings

15. Unscrew the nut and detach the cable from the starter motor. Release the starter motor cable from the frame right downtube, noting its correct routing.

16. Release the single fixing retaining the oil cooler and the rear brake fluid reservoir/bracket upper to the cradle tubes.

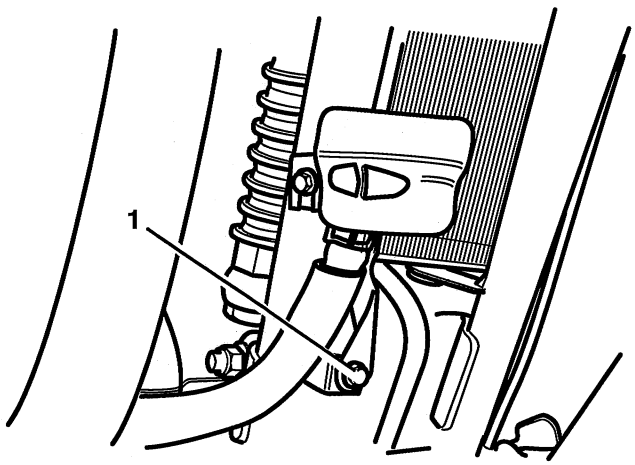


1. Oil cooler fixing

2. Rear brake fluid reservoir/bracket

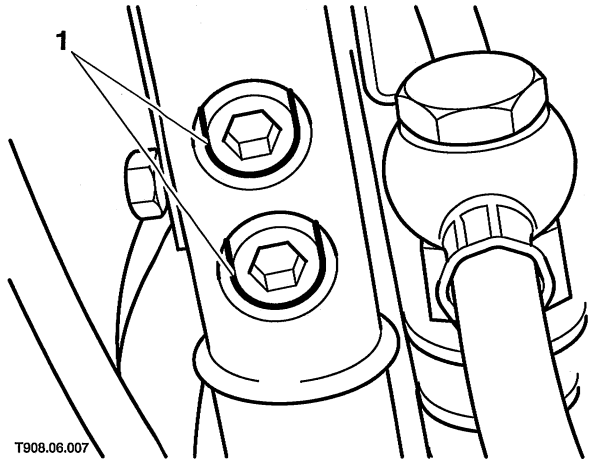
17. Release the lower fixing securing the rear brake fluid reservoir/bracket to the frame.

WARNING: To prevent air entering the braking system, ensure that the reservoir is held in an upright position and is elevated above the rear brake master cylinder. A dangerous riding condition leading to an accident could result if this warning is ignored.

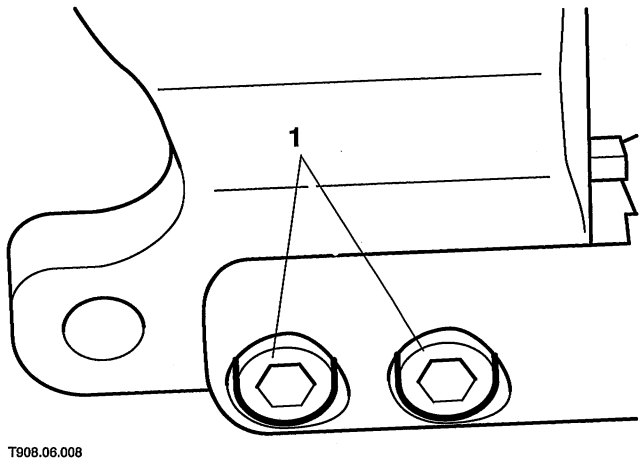


1. Rear brake fluid reservoir bracket bolt

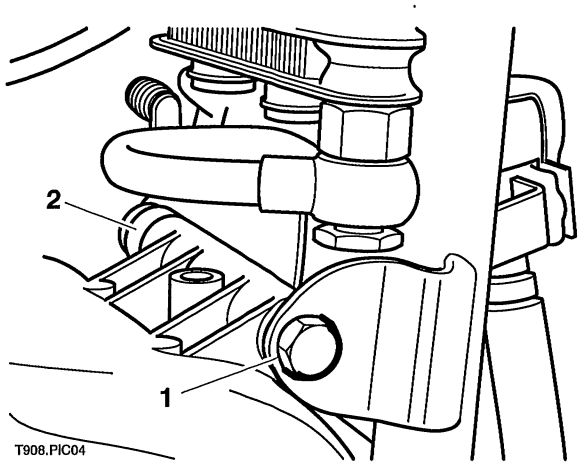
18. Release the cradle tube fixings leaving the front lower engine mounting bolt and spacer in place as a support.



1. Upper cradle tube fixings



1. Lower cradle tube fixings



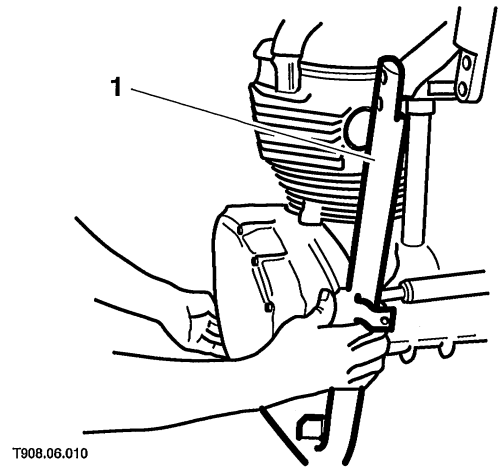
1. Front lower engine mounting bolt

2. Spacer

19. With the aid of an assistant, raise and support the oil cooler such that it clears its lower mounting dowels then detach the left hand cradle tube collecting the horn bracket, engine mounting bolt and spacer as you do so.

20. Collect the oil cooler and hoses and place to one side.

21. Remove the right hand frame cradle tube and front lower engine mounting bolt collecting the oil cooler bracket as you do so.



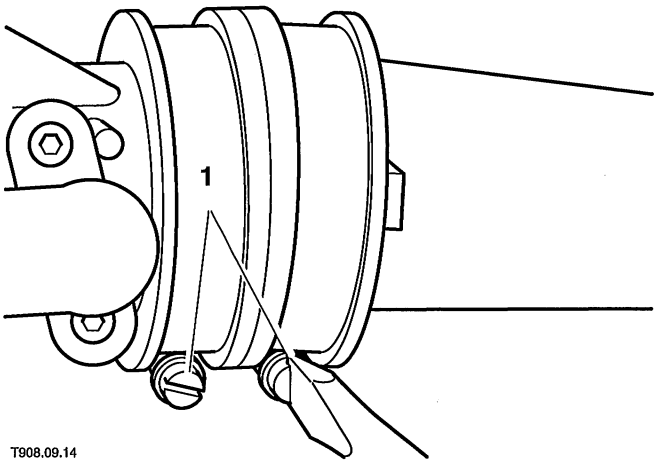
1. Right hand frame cradle tube

22. Set the chain adjustment to give maximum free play in the drive chain (see rear suspension section).

23. Detach the drive chain from the output sprocket.

24. Position a second jack beneath the rear of the engine. Raise the jack to support the engine's weight.

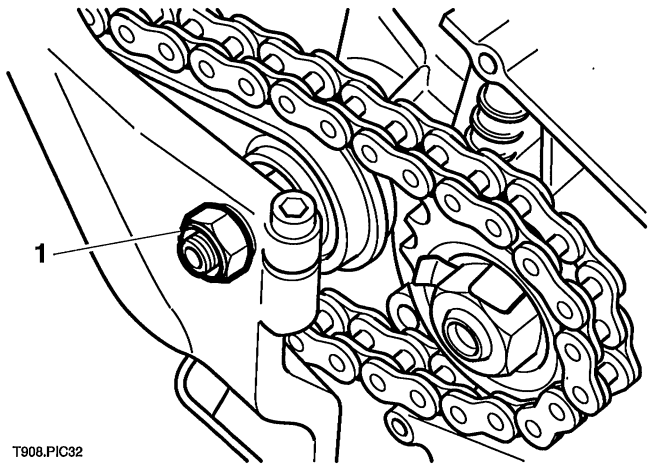
25. Release the clips securing the carburettor rubbers to the inlet adapters and carburettors.



1. Clips

26. Slacken but do not remove the swinging arm spindle clamp bolts on both sides.

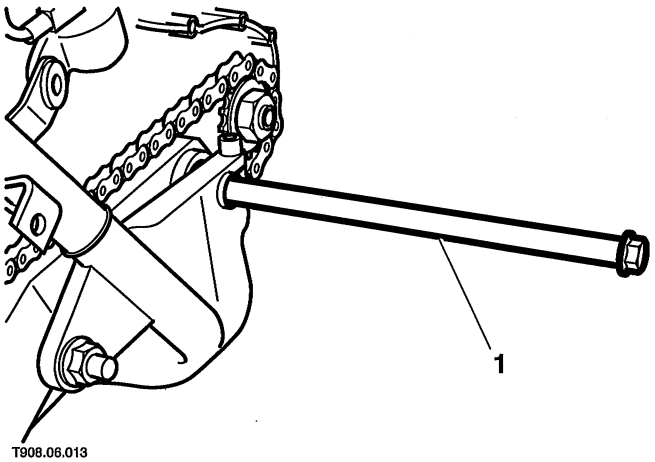
27. Release the swinging arm spindle nut.



1. Spindle nut

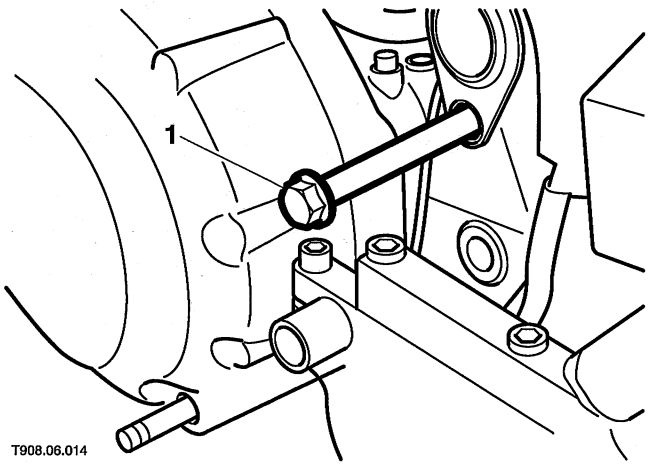
28. Using a soft-faced drift, drive the swinging arm spindle through the frame and engine until its end clears the crankcase, but is still engaged in the swinging arm and frame outrigger (this helps to retain the swinging arm in position).

WARNING: With the swinging arm spindle sticking out at the side of the motorcycle, take care to warn of a trip hazard to other workshop users. Failure to warn of a trip hazard could lead to a fall causing personal injury to others.



1. Swinging arm spindle

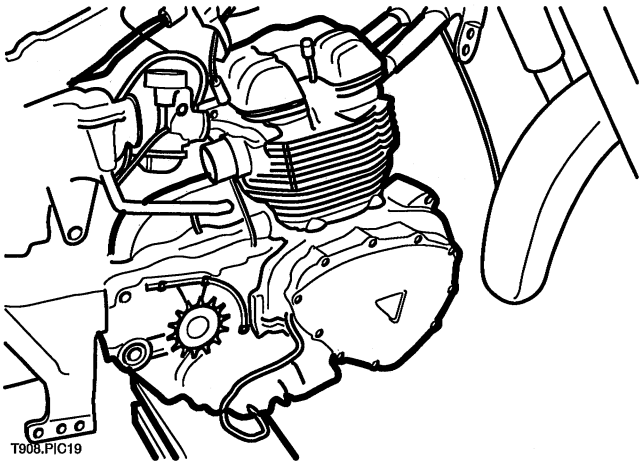
29. Release and remove the lower rear engine mounting bolt.



1. Lower rear engine mounting bolt

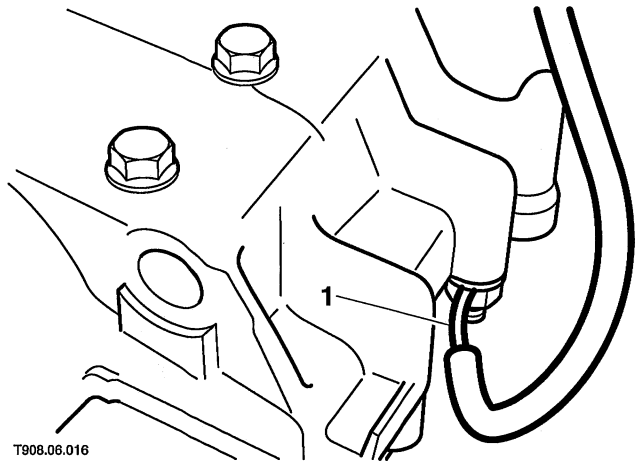
30. Release and remove the upper rear engine mounting bolt.

31. Pivot the engine downwards with the jack using the front upper engine mounting bolt as the pivot point. Ensure that the carburettor rubbers clear the carburettors.



Pivoting the engine from the front upper engine mounting bolt

32. Release the earth lead from the rear of the engine.



1. Earth lead

33. Raise the engine slightly and, with the aid of an assistant, remove the final engine mounting bolt.

34. Lower the engine and separate it from the frame.

Installation

1. Position the engine beneath the frame and sit it on the jack.

2. Raise the engine and engage the front upper engine mounting, installing the bolt from the right hand side.

3. Pivot the engine upwards at the rear and refit the earth lead. Tighten the earth lead fixing to **28 Nm.**

4. Continue to raise the engine until the remaining engine mounting bolts can be inserted, including the swinging arm spindle. Ensure the carburettor rubbers also engage correctly to the inlet tubes.

NOTE:

- **All engine mounting bolts must be inserted from the left whereas the swinging arm spindle (which is not fully removed for removal) must be inserted from the right.**

5. With the engine mounting bolts installed, remove the jack supporting the engine.

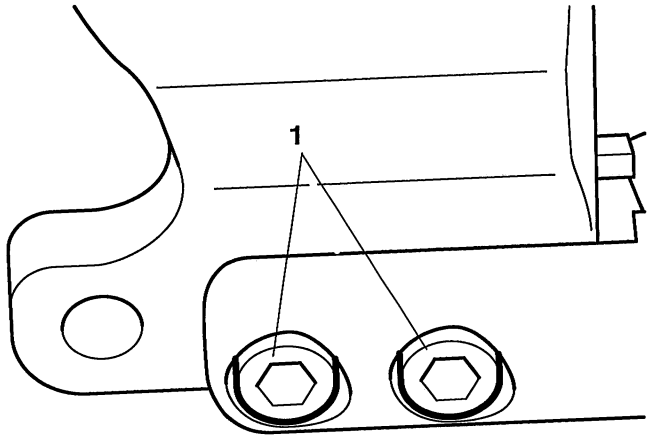
6. With the aid of an assistant, position the oil cooler and hoses to the frame tube. Ensure the oil cooler 'feet' engage in the sockets in the frame cradle tubes.

7. Fit the frame tubes locating the horn bracket from the upper left mounting position and the oil cooler bracket from the upper right.

8. Fit all the frame tube bolts (and large spacer on the centre-lower bolt) but do not tighten at this stage.

9. Tighten the engine mounting bolts to **80 Nm.**

10. Tighten all frame-tube bolts to **55 Nm.**



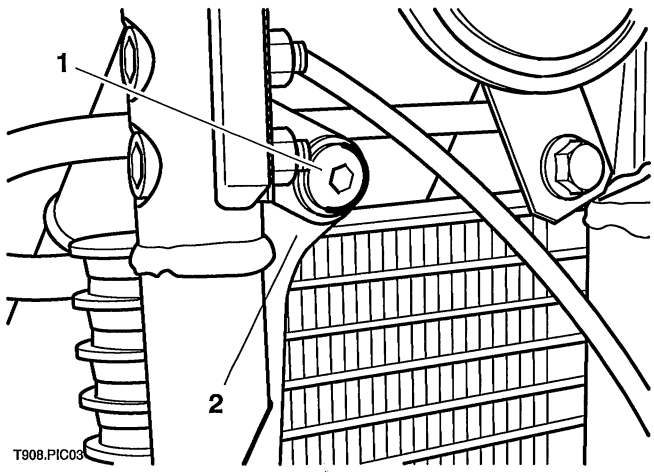
1. Frame tube bolts (two of eight shown)

11. Push the swinging arm spacers through the frame into full engagement with the swinging arm.

12. Tighten the swinging arm spindle nut to **110 Nm.**

13. Tighten both swinging arm spindle clamp bolts to **45 Nm.**

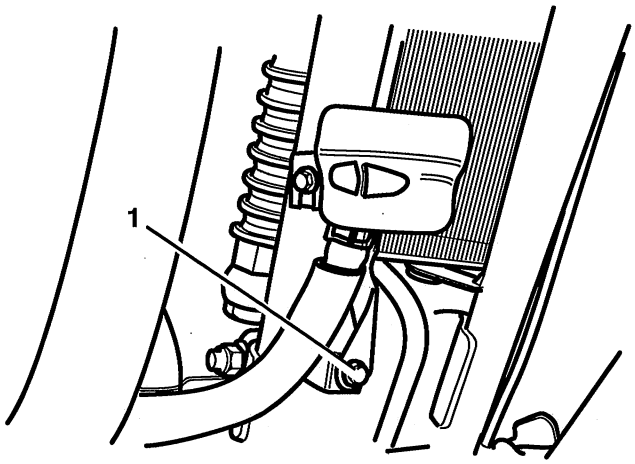
14. Ensure the oil cooler is still located in the sockets, position the rear brake fluid reservoir/bracket then fit and tighten the oil cooler mounting bolt to **9 Nm.**



1. Oil cooler fixing

2. Rear brake fluid reservoir bracket

15. Secure the rear brake fluid reservoir/bracket to the frame with the lower fixing, tighten the fixing to **12 Nm.**



1. Rear brake fluid reservoir bracket bolt

16. Ensure the starter motor cable is correctly routed and reconnect it to the motor. Tighten the terminal nut to **7 Nm.** Seat the rubber cap over the nut and secure the cable to the frame downtube.

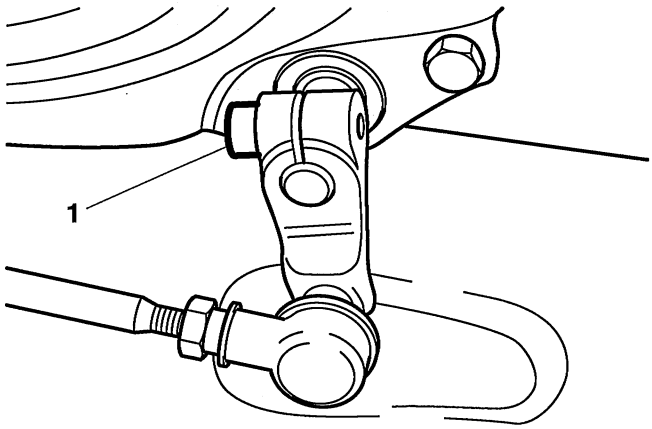
17. Reconnect the alternator, ignition pick-up coil, low oil pressure warning light switch and neutral light wiring connectors. Ensure all wiring is correctly routed.

18. Reconnect the crankcase breather hose to the engine.

19. Reconnect and adjust the clutch cable (see clutch section).

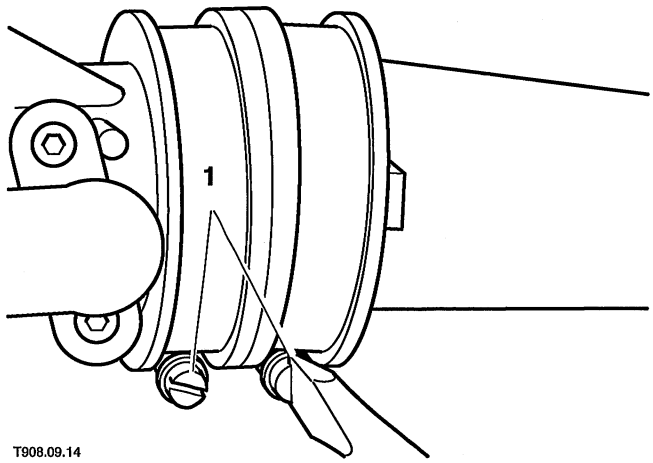
20. Release and refit the footrest mounting plate and tighten its fixings to **30 Nm.**

21. Position the gearchange lever as was noted prior to removal and fit it to the shaft. Tighten the clamp bolt to **9 Nm.**



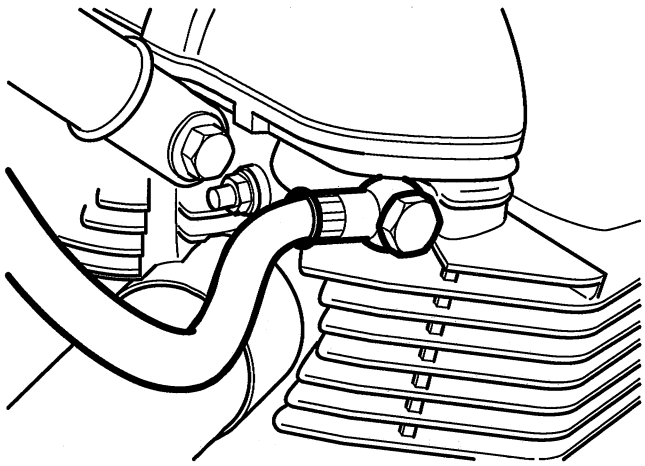
1. Gearchange shaft

22. Position and tighten the carburettor hose clips.



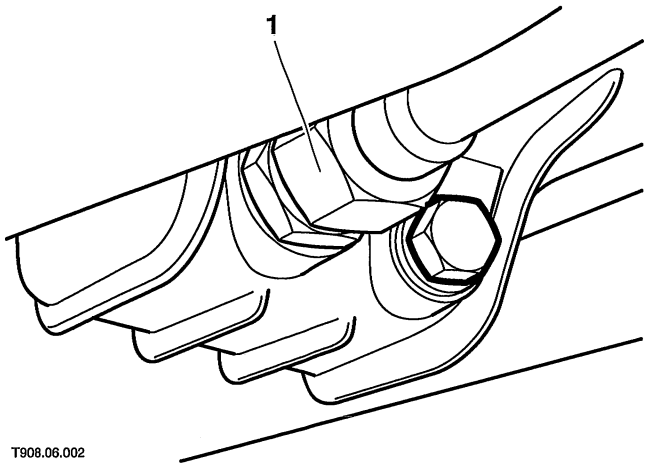
1. Retaining clips

23. Incorporating new sealing washers, fit and tighten the oil cooler hoses to the cylinder head. Tighten to **30 Nm.**



1. Oil cooler feed pipe connection

24. Fit and tighten the oil cooler connection to the sump. Tighten to **45 Nm** while holding the sump union to prevent it from turning.



1. Oil cooler sump connection

25. Locate the chain to the output sprocket.

26. Refit the sprocket cover tightening the bolts to **9 Nm.**

26. Refit the hoses connecting the secondary air valve to the unions on the cylinder head.

27. Refit the HT leads to the spark plugs.

28. Install the exhaust system as described in the fuel system section.

29. Fill the engine with the correct grade and type of engine oil (see lubrication section).

30. Fit the battery box.

31. Refit the fuel tank as described in the fuel system section.

32. Refit the evaporative canisters (California only).

33. Install the battery, reconnect the positive (red) lead first.

34. Lower the motorcycle, remove the jack and park it on the side stand.

35. Check and adjust the drive chain free play as described in the final drive section.

36. Start the engine and check for correct operation of all systems, check also for oil leaks, exhaust leaks and for unusual noises. Rectify all as necessary.

CRANKCASES

NOTE:

- **The crankcase consists of upper and lower halves which are machined as a matched set. They must never be assembled to non-matching halves.**

Disassembly

1. Remove the engine from the frame.

2. Remove the following items (see relevant sections for removal details):

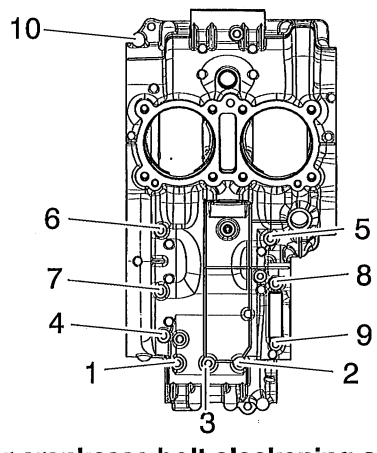
- Alternator rotor.
- Clutch assembly.
- Starter motor.
- Sump and oil pick-up.
- Camshaft drive gear (only necessary if the crankshaft is to be removed).
- Cylinder head, barrels and pistons (only necessary if the connecting rods are to be removed).

CAUTION: Failure to follow the correct bolt release sequence may result in permanent crankcase damage.

3. With the engine upright, evenly and progressively slacken the upper crankcase bolts in the sequence shown. Once all bolts are loose, remove them.

NOTE:

- **There are three different lengths of upper crankcase bolt (all bolts are M8).**



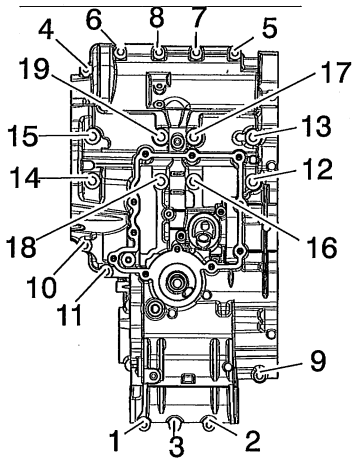
Upper crankcase bolt slackening sequence

4. Invert the engine.

5. Evenly and progressively slacken the lower crankcase bolts in the sequence shown. Once all bolts are loose, remove them.

NOTE:

- **There are three different lengths of M8 lower crankcase bolt. The main bearing bolts are M10.**



Lower crankcase bolt slackening sequence

6. Lift the lower crankcase off from the upper crankcase, ensuring the transmission shafts remain in the upper crankcase. Take care not to lose the three locating dowels and the lower main bearing shells as the crankcase halves are separated. Store the lower main bearing shells in their correct fitted locations in the lower crankcase half.

CAUTION: Do not use levers to separate the upper and lower crankcase halves or damage to the crankcase halves could result.

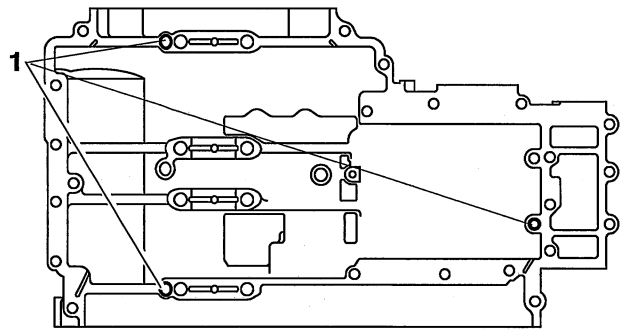
Reassembly

1. Ensure that the balancer shafts, transmission shafts, crankshaft and connecting rods are all correctly fitted to the upper crankcase half.

2. Ensure the selector drum and forks, oil pressure relief valve and lower main bearing shells are correctly fitted to the lower crankcase half.

3. Position the transmission shafts and the selector drum in the neutral position.

4. Ensure that the three locating dowels are located in the upper crankcase.



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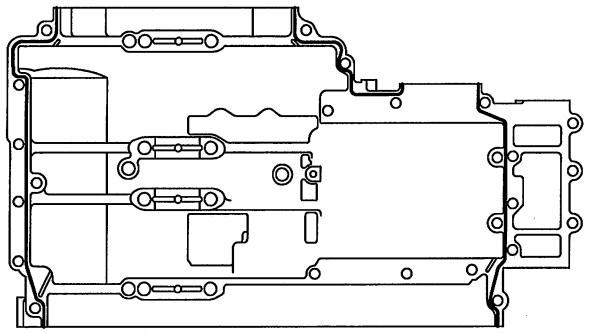
1. Dowels

5. Using a high-flash point solvent, clean the mating surfaces of both crankcase halves. Wipe the surfaces clean with a lint-free cloth.

6. Apply a thin (1.5 to 2 mm thick) bead of silicone sealant (such as Three Bond 1216 liquid gasket) to the lower crankcase mating surface as shown in the diagram.

CAUTION: Do not use excessive amounts of sealant. The extra sealant may become dislodged and could block the oil passages in the crankcase causing severe engine damage



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Sealer Areas Shown Bold

7. Lubricate the crankshaft journals, lower main bearing shells and selector forks with a 50/50 solution of engine oil and molybdenum disulphide grease.

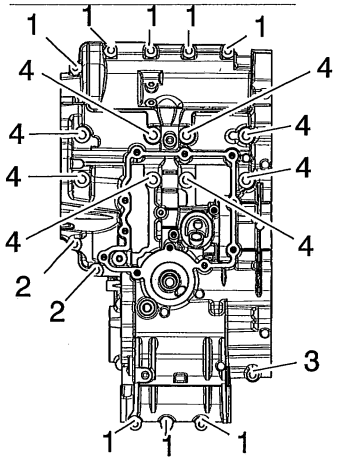
8. Align the lower crankcase half with the upper half and lower it carefully onto the dowels, ensuring the lower main bearing shells remain in position.

CAUTION: Do not force the lower crankcase half onto the upper half. If the lower half will not seat properly, lift it off again and check that the selector forks and gears are correctly positioned. NEVER USE THE BOLTS TO DRAW THE CRANKCASE HALVES TOGETHER.

NOTE:

- **All crankcase bolt threads and under-head areas MUST be oil-free at the point of fitment.**
- **Check and note the colour of the M10 bolts as this detail will become important later on in the assembly procedure.**

9. Once the crankcase halves are correctly assembled, fit the lower crankcase bolts in their correct locations and hand-tighten them.



Lower crankcase bolt locations

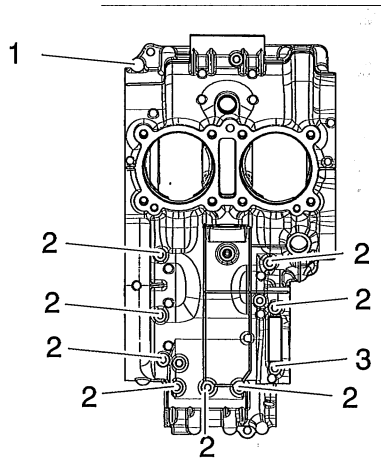
1. M8 x 35 mm

2. M8 x 43 mm

3. M8 x 80 mm

4. M10 x 120 mm

10. Turn the crankcase assembly over and install the upper crankcase bolts in their correct locations and hand-tighten them.



Upper crankcase bolt locations

1. M8 x 35 mm

2. M8 x 80 mm

3. M8 x 105 mm

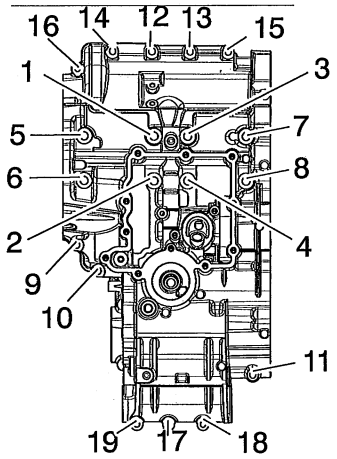
CAUTION: On the following pages, there are two crankcase bolt tightening procedures described. Each procedure is selected according to the colour of the M10 size crankcase bolts. One procedure is for M10 bolts which are silver coloured and one for M10 bolts which are olive green. Always check the colour of the M10 bolts before tightening and select the correct procedure.

Failure to use the correct tightening procedure will result in a tight engine and premature wear of a range of engine components.

Tightening Procedure - crankcases fitted with SILVER M10 bolts.

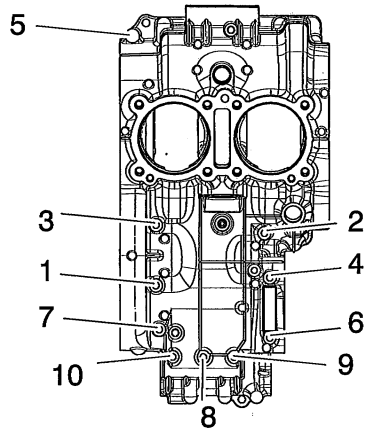
11. Invert the crankcase assembly then tighten the lower crankcase bolts to **10 Nm** in the specified sequence.

> ⚠ **CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.**



Lower crankcase bolt tightening sequence

12. Turn the crankcase assembly over then tighten the upper crankcase bolts to **10 Nm** in the specified sequence.

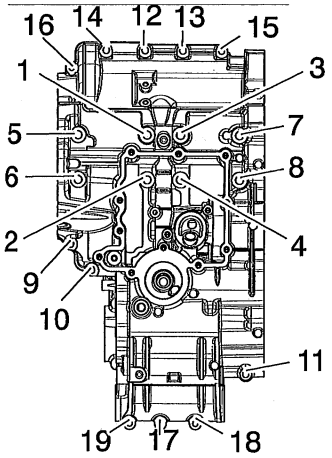


Upper crankcase bolt tightening sequence

> ⚠ **CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.**

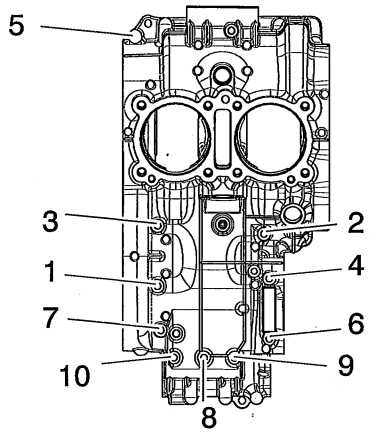
13. Tighten the M10 main bearing bolts in the lower crankcase (bolts 1 to 8) to **40 Nm** in the specified sequence.

14. Tighten the remaining lower crankcase bolts (bolts 9 to 19) to **28 Nm** in the specified sequence.



Lower crankcase bolt tightening sequence

15. Turn the crankcase assembly over then tighten the upper crankcase bolts to **28 Nm** in the specified sequence.



Upper crankcase bolt tightening sequence

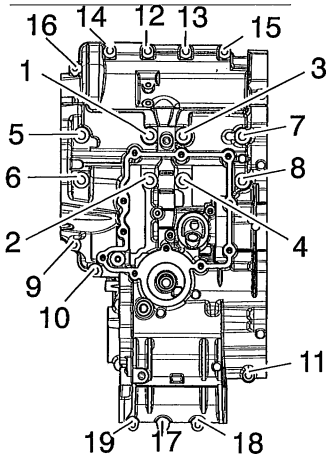
NOTE:

- **Silver-bolt crankcases - proceed to paragraph 21.**

Tightening Procedure - crankcases fitted with OLIVE GREEN M10 bolts.

16. Turn the crankcase assembly over then tighten the lower crankcase bolts to **10 Nm** in the specified sequence.

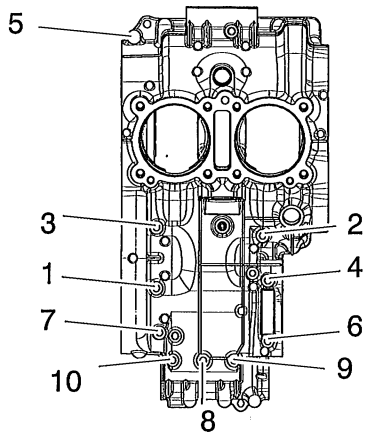
CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.



Lower crankcase bolt tightening sequence

17. Turn the crankcase assembly over then tighten the upper crankcase bolts to **10 Nm** in the specified sequence.

CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.

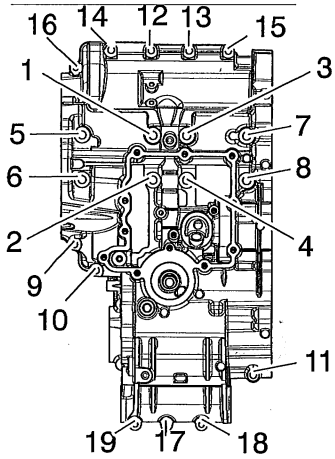


Upper crankcase bolt tightening sequence

18. Turn the crankcase assembly over then tighten lower crankcase bolts 1 to 8 to 35 **Nm** in the specified sequence.

19. Tighten lower crankcase bolts 9-19 to **28 Nm** in the specified sequence.

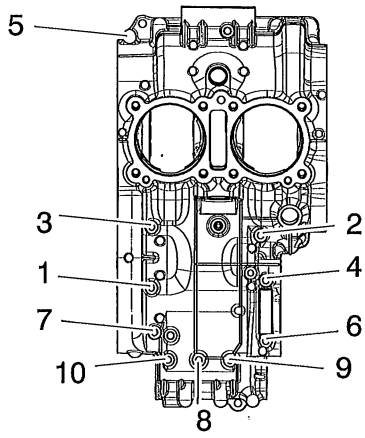
CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.



Lower crankcase bolt tightening sequence

20. Turn the crankcase assembly over then tighten the upper crankcase bolts to **28 Nm** in the specified sequence.

CAUTION: Failure to follow the correct bolt tightening sequence may result in permanent crankcase damage.



Upper crankcase bolt tightening sequence

21. Check that the crankshaft and transmission shafts rotate smoothly. Investigate and rectify any problems before proceeding.

22. Refit the following items (see relevant sections for installation details).

- Alternator rotor
- Clutch assembly
- Starter motor
- Sump and oil pick-up
- Pistons, barrels and cylinder head (where removed)
- Camshaft drive gear (where removed)

23. Refit the engine to the frame.

CRANKSHAFT

NOTE:

- **New connecting rod big-end fixings will be required on installation.**
- **If the pistons have been removed, the crankshaft can be removed complete with connecting rods (if required).**

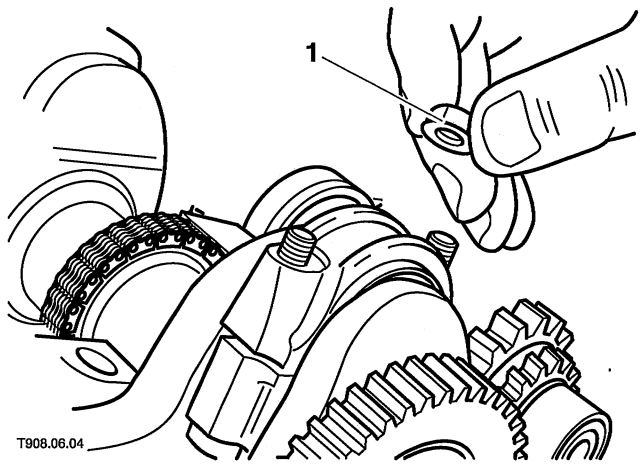
Removal

1. Disassemble the crankcase halves.
2. Rotate the crankshaft to bring each piston to BDC.

NOTE:

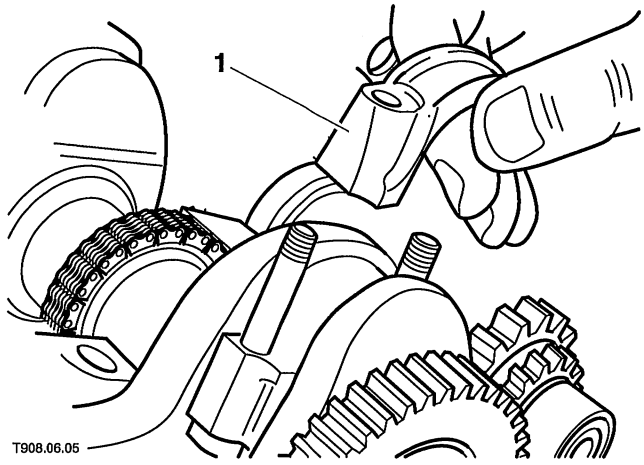
- **This must be done one-at-a-time on America, Scrambler and Speedmaster engines.**

3. Mark each connecting rod big-end cap to show its correct fitted location and orientation prior to removal (see installation for details of rod markings).
4. Evenly and progressively slacken and remove the big-end cap nuts/bolts.



1. Big-end cap nut

5. Remove the big-end caps, complete with the lower bearing shells.



1. Big-end cap

6. Push each connecting rod and piston assembly up its bore to free it from the crankshaft. Ensure the upper bearings remain in the connecting rods.

CAUTION: Support the connecting rods as they are freed from the crankshaft to prevent them falling against the cylinder bores and causing damage.

7. Lift the crankshaft, complete with cam chain, out from the upper crankcase half. Ensure all upper main bearing shells remain in position in the crankcase.

CAUTION: Never move the connecting rods down past BDC. If a rod is moved too far down, the piston rings will be released from the base of their bore and the piston will become trapped between the barrels and crankcase.

Inspection

1. Remove all main and big-end bearing shells. Inspect for damage, wear, overheating (blueing) and any other signs of deterioration. Fit a new set of main and/or big-end bearing shells if damage, wear, overheating or deterioration is found. If a new set of bearing shells are being fitted, use the bearing selection processes detailed later in this section.

2. Inspect the crankshaft bearing surfaces for grooves or pitting and measure the diameter of each journal. If any grooving or pitting is found, or if any of the journals are worn beyond the specified limits, fit a new crankshaft.

Main bearing journal diameter:

Standard	**37.960 to 37.976 mm**
Service limit	**37.936 mm**

Big-end bearing journal diameter:

Standard	**40.946 to 40.960 mm**
Service limit	**40.932 mm**

3. Check crankshaft endfloat. If the crankshaft endfloat is outside the specified service limits, the crankshaft and/or the crankcase must be renewed.

Crankshaft endfloat:

Standard	**0.05 to 0.20 mm**
Service limit	**0.4 mm**

4. Inspect the balancer gear, primary drive gear and cam chain gear for damage or wear. If either gear is damaged, the crankshaft must be renewed.

Installation

CAUTION: Always check the bearing journal clearances, as described later in this section, before final assembly of the crankshaft. Failure to select the correct bearing shells will result in severe engine damage.

CAUTION: Never re-use connecting rod fixings. If a connecting rod cap is disturbed, always discard the fixings and fit new ones. Using the original fixings may lead to big end bolt fractures causing severe engine damage.

1. In order to enable the balancer timing to be easily set, remove the rear balancer.

NOTE:

- **It is possible to time both balancers as the crankshaft is fitted but this is a more difficult procedure.**
- **The balancer timing procedure is described later in this section.**

2. Where connecting rods are fitted with nuts and bolts, install **new** bolts.

NOTE:

- **Use a soft-faced mallet to remove the old bolts.**
- **The new connecting rod big-end fixings are coated with an anti-rust solution which must not be removed.**
- **Ensure each bolt is pressed fully into the connecting rod.**

3. Ensure the upper big-end bearing shells are correctly fitted to the connecting rods and the upper main bearing shells are correctly installed in the crankcase.

NOTE:

- **If new bearing shells are to be fitted, always follow the selection process described elsewhere in this section.**
- **The bearing shells are keyed and can only be fitted one way.**

4. Lubricate the running surfaces of all bearing shells in the connecting rods with a 50/50 solution of engine oil and molybdenum disulphide grease.

5. Ensure that the crankshaft is clean and that the oilways within the crankshaft are free from blockages and debris.

6. Fit the cam chain to the crankshaft and locate it on its sprocket.

7. Lower the crankshaft and cam chain into position. As the gears mesh, align the timing mark on the crankshaft gear with the timing mark on the front balancer gear, then seat the crankshaft in the crankcase.

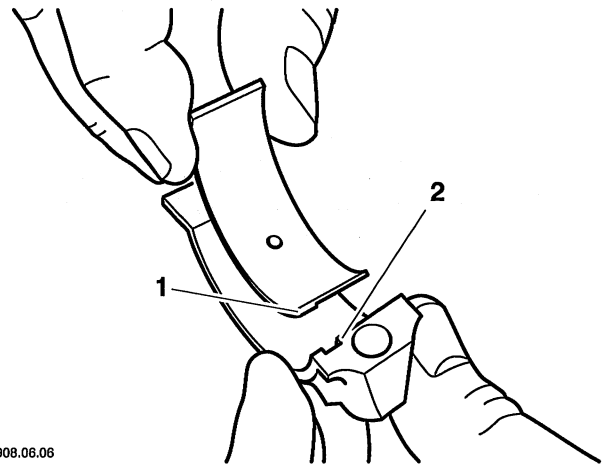
8. Ensure the crankshaft and front balancer gears are correctly timed then install the rear balancer.

9. Set the crankshaft to BDC then pull both connecting rods down and locate them on their big-end journals.

NOTE:

- **This must be done one-at-a-time on America & Speedmaster engines.**

10. Ensure the lower bearing shells are correctly fitted to the big-end caps. Lubricate the running surfaces of the big-end cap shells with a 50/50 solution of engine oil and molybdenum disulphide grease.



T908.06.06

1. Bearing shell tab

2. Cutout

11. Fit the big-end caps and lower bearing shells to the connecting rods.

NOTE:

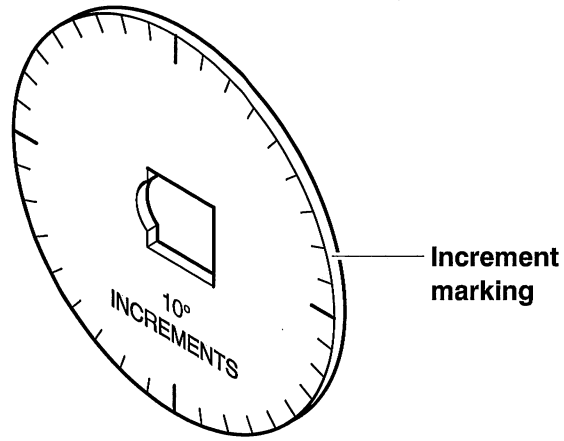
- **Ensure that the big-end caps are fitted to the correct connecting rods and are fitted the right way around (the size group marking on the cap and the weight group marking on the rod should both be facing the rear).**

WARNING: Failure to use the correct procedure to tighten the connecting rod big-end fixings could result in fracture of the bolts in service. Fractured big end fixings will cause serious engine damage which is an unsafe riding condition potentially resulting in rider injury.

CAUTION: Ensure a torque wrench of known and accurate calibration is used. The torque characteristics of the connecting rod nuts and bolts are sensitive to the rate at which they are tightened. If all the torque is applied in one action the bolt may be stretched and the nut could become loose when in service, resulting in severe engine damage.

NOTE:

- **Use service tool 3880105-T0301 to ensure accuracy when angle-tightening.**

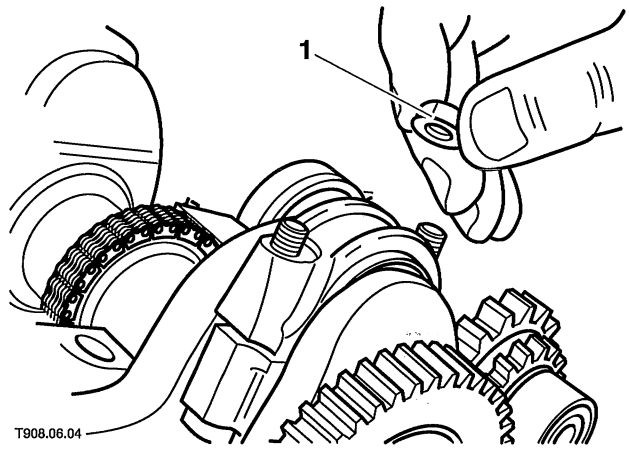


05.16-2

Service tool 3880105-T0301

CAUTION: Different tightening methods are used for tightening the big end fixings. Failure to use the correct procedure to tighten the connecting rod big-end fixings could result in failure of the fixings in service, leading to serious engine damage.

12. Where connecting rods are fitted with nuts and bolts, lubricate the threads and the face of the **new** nuts with molybdenum disulphide grease then fit the nuts to the big-end bolts.



1. Big-end cap nut

13. Tightening the big end **nuts** is a five-stage process as follows

    a. Evenly and progressively **tighten** the big-end nuts to **22 Nm**.

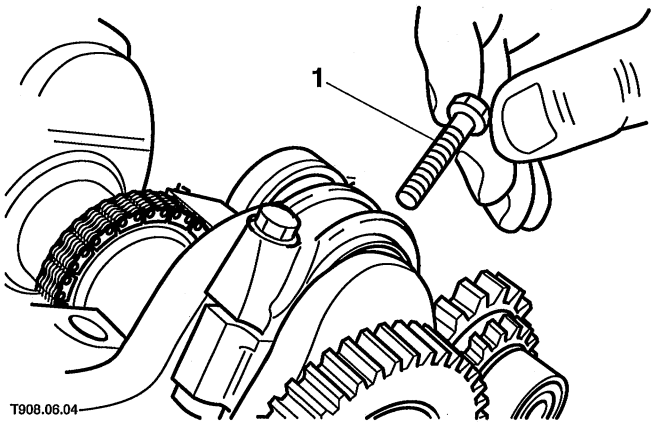
    b. **Release** (undo) the big-end nuts through **140°**.

    c. Evenly and progressively **tighten** the big-end nuts to **10 Nm**.

    d. Evenly and progressively **tighten** the big-end nuts to **14 Nm**.

    e. Evenly and progressively **tighten** the big-end nuts through **120°**.

14. Where connecting rods are fitted with bolts only, lubricate the threads and under the head areas of the **new** bolts with molybdenum disulphide grease then fit the bolts to the big-end.



1. Big-end cap bolt

15. Tightening big end **bolts** is a two-stage process as follows

    a. Evenly and progressively **tighten** both big-end bolts to **14 Nm.**

    b. Evenly and progressively **tighten** both big-end bolts through **120°.**

MAIN BEARING SHELL SELECTION AND JOURNAL CLEARANCE CHECK

Shell selection

1. To allow for tolerances during manufacture, four different thicknesses of main bearing shell are produced. The shells are colour-coded for identification purposes (White, Red, Blue or Green); the identification mark being in the form of a paint marking on the edge of the shell. Bearing shell selection procedure is listed below.

2. Measure each crankshaft main bearing journal diameter.

3. Assemble the crankcase halves with the crankshaft and main bearing shells removed and measure each crankcase main bearing bore diameter.

4. Select the correct thickness bearing shells required for each journal using the following table. The crankshaft journal diameter is given along the top and the crankcase bore size down the side; the correct bearing thickness required is given at the point of intersection.

	CRANKSHAFT JOURNAL DIA' (mm's)	
CRANK-CASE BORE DIA'	37.960 - 37.968	37.969 - 37.976
41.104 to 41.112 mm	RED	WHITE
41.113 to 41.121 mm	BLUE	RED
41.122 to 41.130 mm	GREEN	BLUE

Journal clearance check

1. The main bearing journal clearances are measured using *Plastigage* (Triumph part number 3880150-T0301) as follows.

   a. Ensure all upper and lower main bearing shells are correctly fitted to the crankcase halves.

   b. Wipe clean the bearing shells and crankshaft journals then lay the crankshaft in position in the upper crankcase.

   c. Apply a thin smear of grease to the exposed part of each main bearing journal and a small quantity of silicone release agent to each lower bearing shell.

   d. Size a piece of *Plastigage* to fit across each main bearing journal.

   e. Fit the *Plastigage* to each main bearing journal, using the grease to hold it in place.

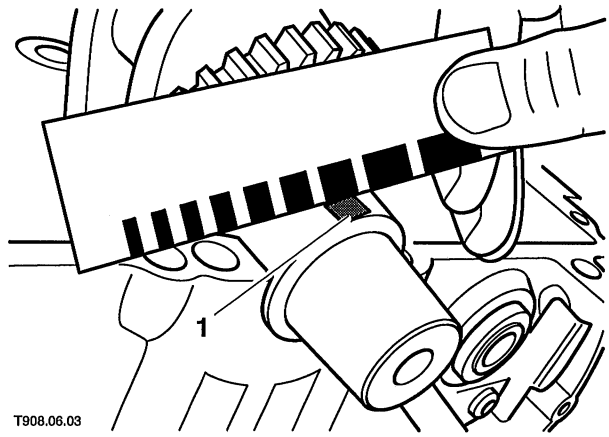
   f. Carefully reassemble the crankcases, taking care not to rotate the crankshaft. Fit the M10 main bearing bolts and tighten the bolts to the specified torque in the specified sequence (see crankcase reassembly).

NOTE:

- **Do not allow the crankshaft to rotate as the crankcases are assembled/separated. Any rotation of the crankshaft will distort the *Plastigage*, resulting in a false reading.**

   g. Remove the main bearing bolts and separate the crankcase halves, again taking care not to rotate the crankshaft.

   h. Using the gauge provided with the *Plastigage* kit, measure the width of the compressed *Plastigage* to obtain the journal clearance.



1. Compressed *Plastigage*

Main bearing journal clearance:

Standard	**0.019 to 0.044 mm**
Service limit	**0.10 mm**

2. If the clearance exceeds the specified limits, select a complete new set of bearing shells and repeat the check.

3. If the clearance still exceeds the specified limits with new shells of the correct thickness, the crankshaft must be worn and will have to be renewed.

CONNECTING RODS

NOTE:

- **New connecting rod big-end fixings will be required on installation.**

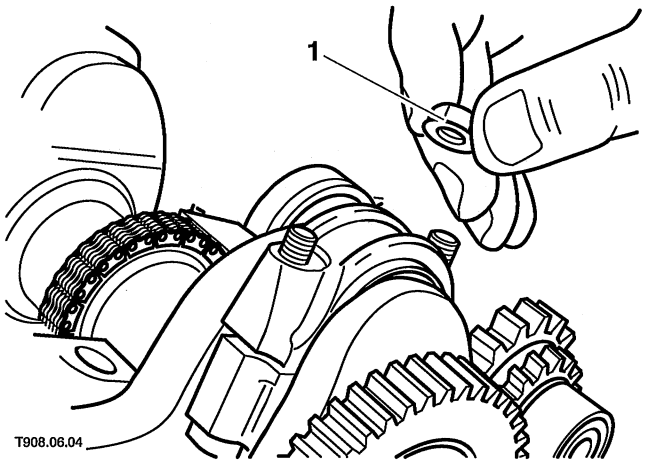
Removal

1. Disassemble the crankcase halves.
2. Rotate the crankshaft to bring each piston to BDC.

NOTE:

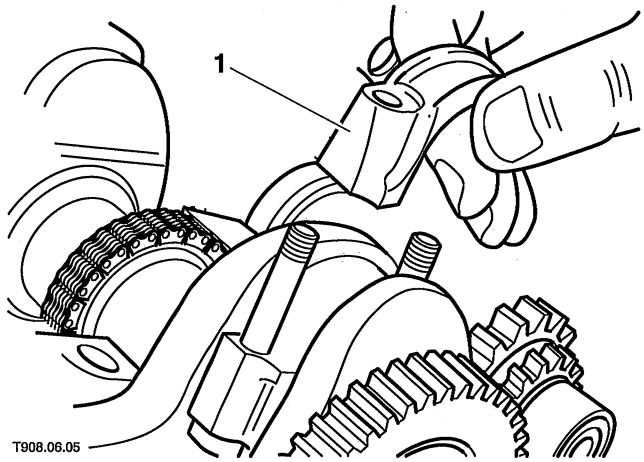
- **This must be done one-at-a-time on America, Scrambler and Speedmaster engines.**

3. Mark each connecting rod big-end cap to show its correct fitted location and orientation prior to removal (see installation for details of rod markings).
4. Evenly and progressively slacken and remove the big-end cap nuts/bolts.



1. Big-end cap nut

6. Remove the big-end cap, complete with the lower bearing shell and remove the connecting rod, complete with the upper bearing shell.



1. Big-end cap

7. Reassemble the rod and cap, complete with bearings, to keep all components together.

NOTE:

- **If both connecting rods are being removed, mark each rod in some way to ensure it is refitted in its original location.**

Inspection

1. Remove the bearing shells and inspect for damage, wear, overheating (blueing) and any other signs of deterioration. Fit a new set of big-end bearing shells if damage, wear, overheating or deterioration is found.

Installation

CAUTION: Always check the big-end bearing journal clearances, as described later in this section, before final assembly of the connecting rods. Failure to select the correct big-end bearing shells will result in severe engine damage.

CAUTION: Never re-use connecting rod fixings. If the connecting rod cap is disturbed, always discard the fixings and fit new ones. Using the original fixings may lead to severe engine damage.

1. Where connecting rods are fitted with nuts and bolts, install **new** bolts.

NOTE:

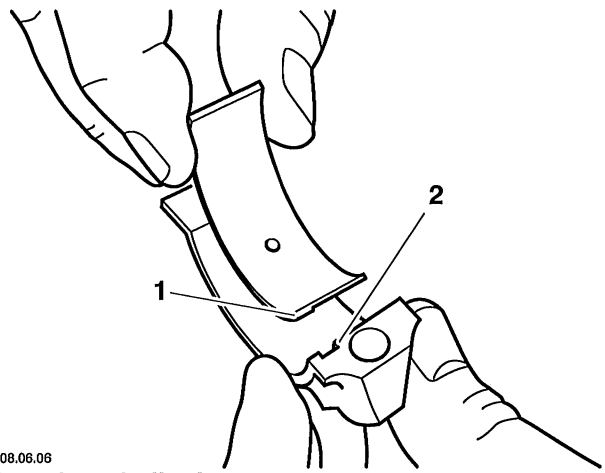
- **New connecting rod big-end fixings are coated with an anti-rust solution which must not be removed.**
- **Ensure, if fitted, each bolt is pressed fully into the connecting rod.**

2. Set the crankshaft to BDC. Each connecting rod can then be installed as follows.

NOTE:

- **This must be done one-at-a-time on America, Scrambler and Speedmaster engines.**

3. Ensure the bearing shells are correctly fitted to the connecting rod and cap. Lubricate the surfaces of the shells and crankshaft journal with a 50/50 solution of engine oil and molybdenum disulphide grease.



T908.06.06

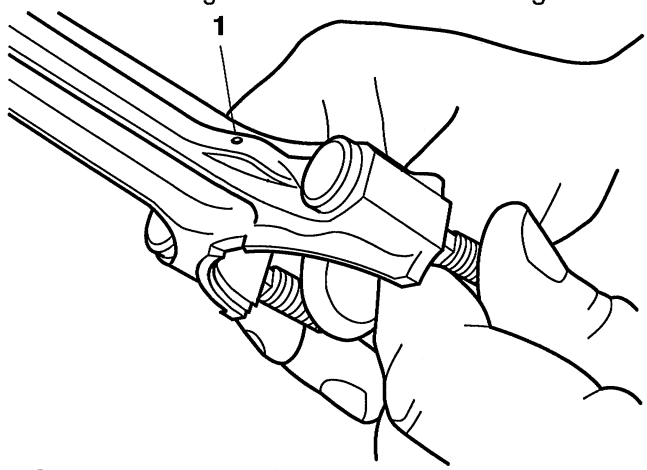
1. Bearing shell tab

2. Cutout

NOTE:

- **If new bearing shells are to be fitted, always follow the selection process described elsewhere in this section.**
- **The bearing shells are keyed and can only be fitted one way.**
- **Where connecting rods are fitted with bolts only, when fitting the bearing shells to the connecting rods, it is normal for a shaving of shell material to be cut from the back of the shell. Ensure that this shaving is removed before the two halves of the connecting rod are assembled.**

4. Fit the connecting rod and upper bearing shell to the crankshaft ensuring the connecting rod oil hole is facing towards the rear of the engine.



1. Connecting rod oil hole

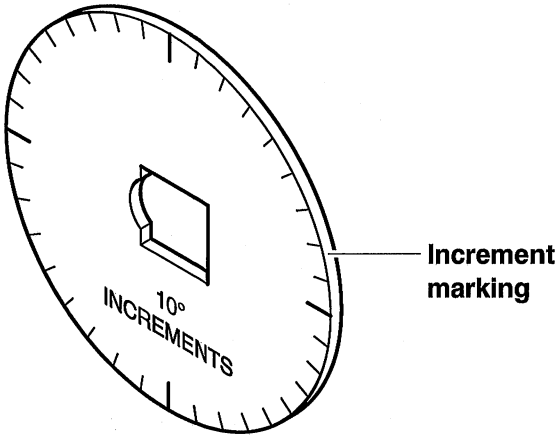
NOTE:

- **If the connecting rod is being refitted, ensure it is fitted in its original location.**
- **Ensure that the big-end cap is fitted the right way around (the size group marking on the cap and the weight group marking on the rod should both be facing the rear).**

5. Fit the big-end cap and lower bearing shell to the connecting rod.

NOTE:

- **Use service tool 3880105-T0301 to ensure accuracy when angle-tightening.**

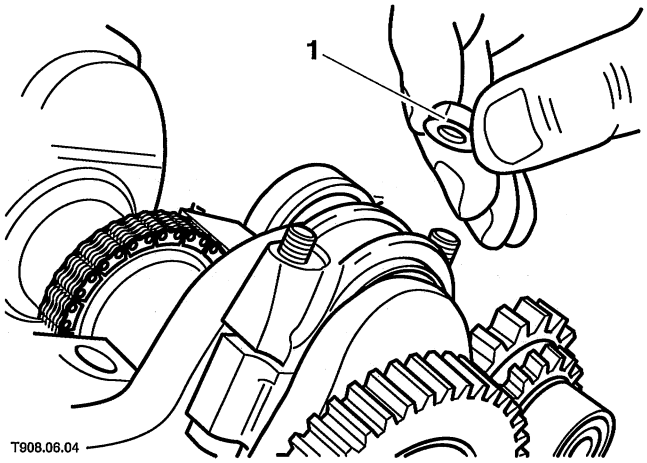


05.16-2

Service tool 3880105-T0301

> **CAUTION: Different tightening methods are used for tightening the big end fixings. Failure to use the correct procedure to tighten the connecting rod big-end fixings could result in failure of the fixings in service, leading to serious engine damage.**

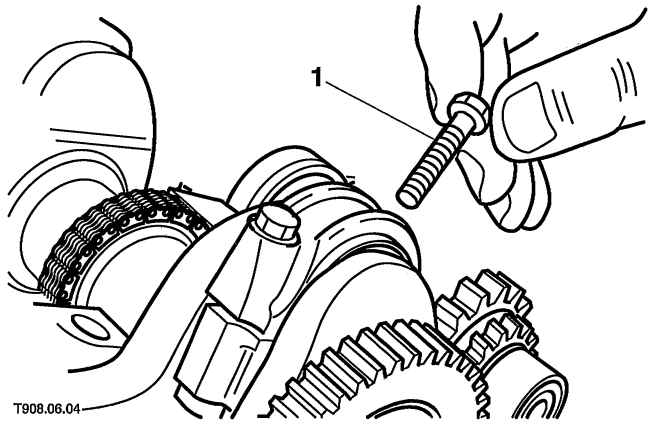
6. Where connecting rods are fitted with nuts and bolts, lubricate the threads and the face of the **new** nuts with molybdenum disulphide grease then fit the nuts to the big-end bolts.



1. Big-end cap nut

7. Tightening the big end **nuts** is a five-stage process as follows
   a. Evenly and progressively **tighten** the big-end nuts to **22 Nm.**
   b. **Release** (undo) the big-end nuts through **140°.**
   c. Evenly and progressively **tighten** the big-end nuts to **10 Nm.**
   d. Evenly and progressively **tighten** the big-end nuts to **14 Nm.**
   e. Evenly and progressively **tighten** the big-end nuts through **120°.**

8. Where connecting rods are fitted with bolts only, lubricate the threads and under the head areas of the **new** bolts with molybdenum disulphide grease then fit the bolts to the big-end.



1. Big-end cap bolt

9. Tightening big end **bolts** is a two-stage process as follows
   a. Evenly and progressively **tighten** both big-end bolts to **14 Nm.**
   b. Evenly and progressively **tighten** both big-end bolts through **120°.**

10. Check the connecting rod is free to rotate smoothly on its journal. Investigate any problems before proceeding.

11. With both connecting rods correctly installed, assemble crankcase upper and lower halves as described earlier in this section.

BIG-END BEARING SHELL SELECTION AND JOURNAL CLEARANCE CHECK

Shell selection - Models prior to engine number 197183

NOTE:

- **To allow for tolerances during manufacture, THREE different thicknesses of big-end bearing shell are produced. The shells are colour-coded for identification purposes (White, Red or Blue); the identification mark being in the form of a paint marking on the edge of the shell. Bearing shell selection is as follows.**

1. Measure each crankshaft big-end bearing journal diameter.
2. Note the connecting rod big-end bearing bore size group marking (A or B) which is etched on the rear of the big-end cap.
3. Select the correct thickness bearing shells required for each connecting rod using the following table. The crankshaft big-end journal diameter is given along the top and the connecting rod size group down the side; the correct bearing thickness required is given at the point of intersection.

Models prior to engine number 197183		
	CRANKSHAFT JOURNAL DIAMETER	
ROD SIZE GROUP	40.946mm to 40.953 mm	40.954mm to 40.960 mm
A	RED	WHITE
B	BLUE	RED

Shell selection - Models from engine number 197183

NOTE:

- **To allow for tolerances during manufacture, TWO different thicknesses of big-end bearing shell are produced. The shells are colour-coded for identification purposes (White or Red); the identification mark being in the form of a paint marking on the edge of the shell. Bearing shell selection is as follows.**

1. Measure each crankshaft big-end bearing journal diameter.
2. Select the correct thickness bearing shells required for each connecting rod using the following table.

Models from engine number 197183		
	CRANKSHAFT JOURNAL DIAMETER	
	40.946mm to 40.953 mm	40.954mm to 40.960 mm
BEARING SHELL COLOUR	RED	WHITE

Journal clearance check

1. The big-end bearing journal clearances are measured using '*Plastigage*' (Triumph part number 3880150-T0301) as follows.

NOTE:

- **Use the original big-end fixings for the check, not the new ones.**

a. Ensure the upper and lower bearing shells are correctly fitted to the connecting rod and cap.

b. Wipe clean the bearing shells and crankshaft journal.

c. Apply a thin smear of grease to the crankshaft journal and a small quantity of silicone release agent to the lower bearing shell.

d. Size a piece of *Plastigage* to fit across the crankshaft journal.

e. Fit the *Plastigage* to the crankshaft journal, using the grease to hold it in place.

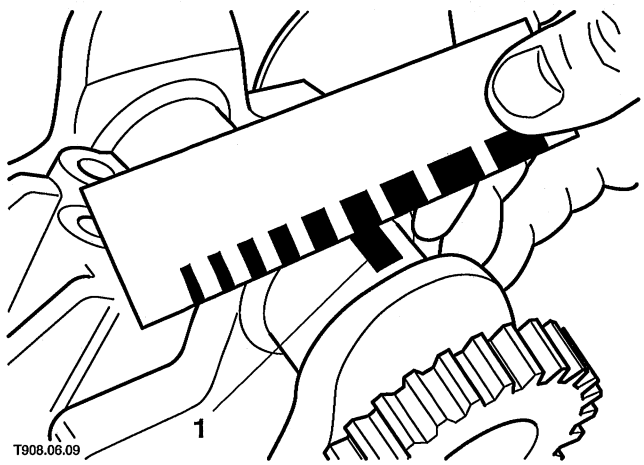
f. Carefully assemble the connecting rod and cap correctly on the crankshaft journal, positioning it so the *Plastigage* is in the centre of the lower bearing shell.

NOTE:

- **Do not allow the connecting rod to rotate on the crankshaft journal. Any rotation of the rod will distort the *Plastigage*, resulting in a false reading.**

g. Remove the connecting rod and bearing cap, again taking care not to rotate the rod.

h. Using the gauge provided with the *Plastigage* kit, measure the width of the compressed *Plastigage* to obtain the journal clearance.



1. Compressed *Plastigage*

Big-end bearing journal clearance:

Standard	**0.036 to 0.066 mm**
Service limit	**0.1 mm**

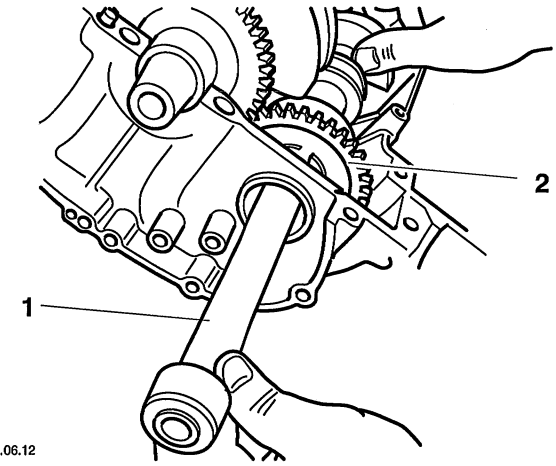
2. If the clearance exceeds the specified limits, select a new set of bearing shells and repeat the check.

3. If the clearance still exceeds the specified limits with new shells of the correct thickness, the crankshaft must be worn and will have to be renewed.

REAR BALANCER

Removal

1. Disassemble the crankcase halves.
2. Undo the rear balancer shaft retaining screw and remove the ignition pick-up coil wiring guide. Discard the screw and remove the locking washer from the balancer shaft.
3. Support the balancer then slide out the balancer shaft. The balancer can then be manoeuvred out of its position in the crankcase.



T908.06.12

1. Shaft
2. Balancer

NOTE:

- **The front and rear balancers are different and are not interchangeable (see installation).**

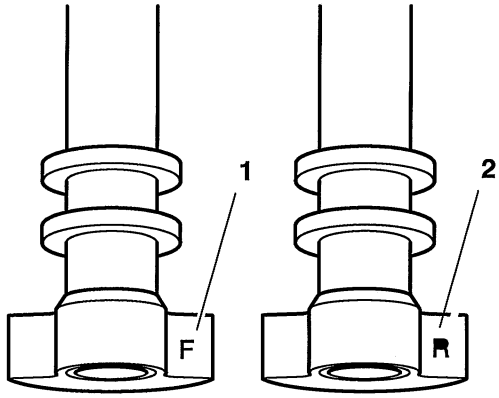
Inspection

1. Inspect the balancer gear for damaged and/or worn teeth. Replace the balancer if necessary.
2. Inspect the balancer needle roller bearings and the shaft contact surfaces for signs of wear or damage. If necessary renew both the balancer assembly and the shaft.

Installation

NOTE:

- **The front and rear balancers are different and are not interchangeable. Each balancer is stamped with an identification marking on the flat of its left-hand end weight; the rear balancer is marked R and the front balancer F.**



T908.06.13

1. Front balancer marking

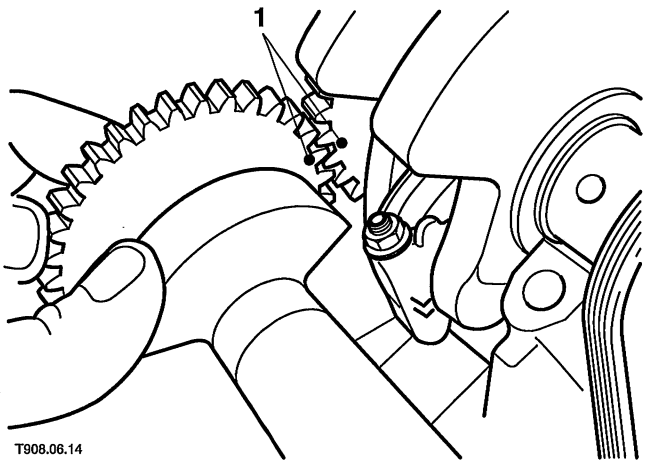
2. Rear balancer marking

1. Ensure the crankshaft and front balancer are correctly timed before installing the rear balancer (see front balancer section).

2. Rotate the crankshaft so its balancer timing mark is facing the rear.

3. Lubricate the balancer needle roller bearings with clean engine oil.

4. Manoeuvre the rear balancer into position, ensuring its timing mark aligns with the crankshaft gear mark as the gears mesh.



T908.06.14

1. Timing marks

5. Insert the balancer shaft, positioning its locking washer cutout next to the retaining screw hole.

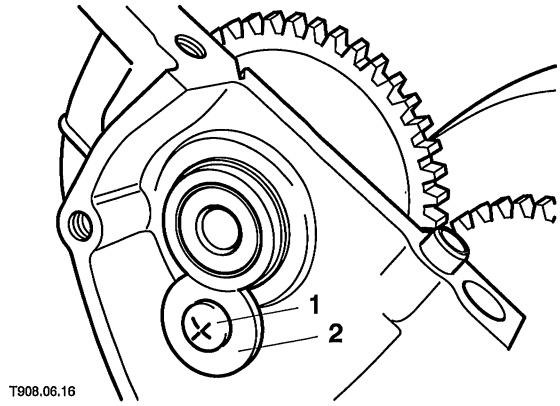
6. Slide the locking washer into the balancer shaft cutout then fit the wiring guide and **new** retaining screw. Ensure the pick-up coil wiring is correctly positioned behind the guide then tighten the screw to **12 Nm.**

7. Assemble the crankcase upper and lower halves.

FRONT BALANCER

Removal

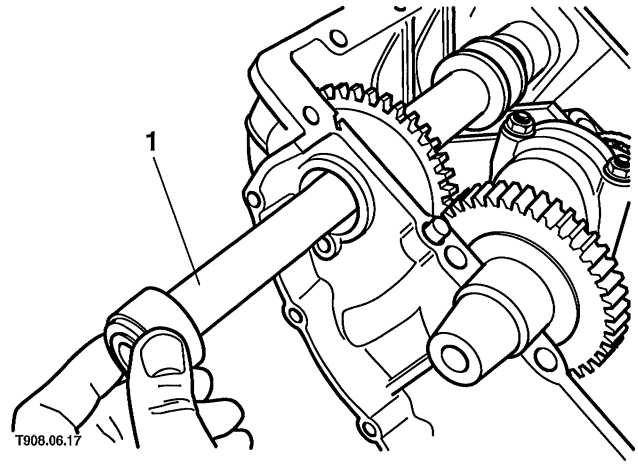
1. Disassemble the crankcase halves.
2. Undo the front balancer shaft retaining screw and slide out the locking washer. Discard the screw.



1. Retaining screw

2. Locking washer

3. Slide out the balancer shaft then lift the front balancer out of the crankcase.



1. Shaft

2. Balancer

NOTE:

- **The front and rear balancers are different and are not interchangeable (see installation).**

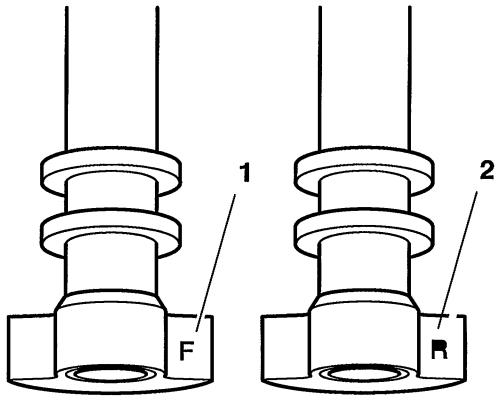
Inspection

1. Inspect the balancer gear for damaged and/or worn teeth. Replace the balancer if necessary.
2. Inspect the balancer needle roller bearings and the shaft contact surfaces for signs of wear or damage. If necessary renew both the balancer assembly and the shaft.

Installation

NOTE:

- **The front and rear balancers are different and are not interchangeable. Each balancer is stamped with an identification marking on the flat of its left-hand end weight; the rear balancer is marked R and the front balancer F.**



T908.06.13

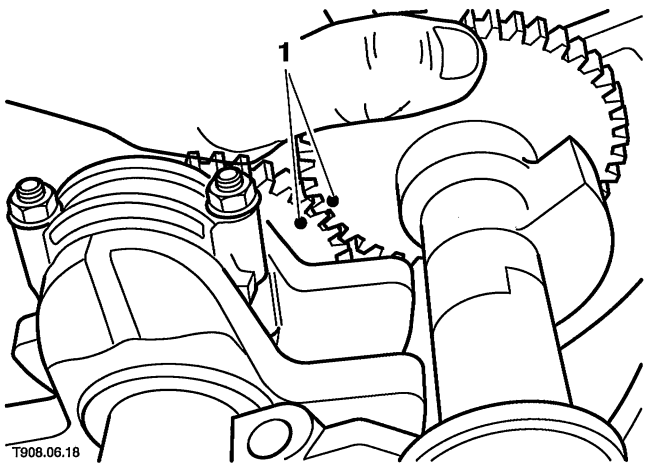
1. Front balancer marking
2. Rear balancer marking

1. Ensure the crankshaft and rear balancer (if fitted) are correctly timed before installing the front balancer (see rear balancer section).

2. Rotate the crankshaft so its balancer timing mark is facing the front.

3. Lubricate the balancer needle roller bearings with clean engine oil.

4. Manoeuvre the front balancer into position, ensuring its timing mark aligns with the crankshaft gear mark as the gears mesh.

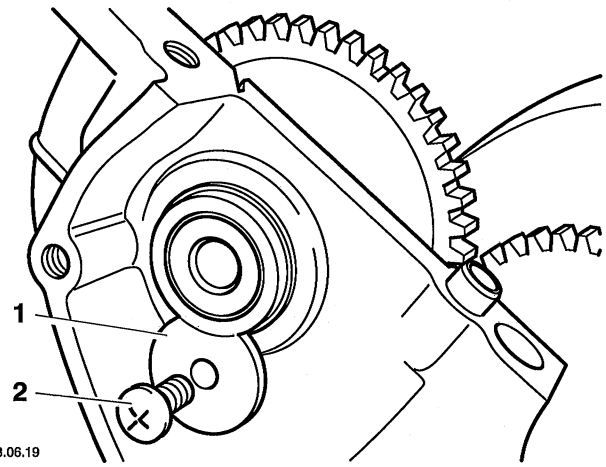


T908.06.18

1. Timing marks

5. Insert the balancer shaft, positioning its locking washer cutout next to the retaining screw hole.

6. Slide the locking washer into the shaft slot and fit the **new** retaining screw. Tighten the screw to **12 Nm**.



T908.06.19

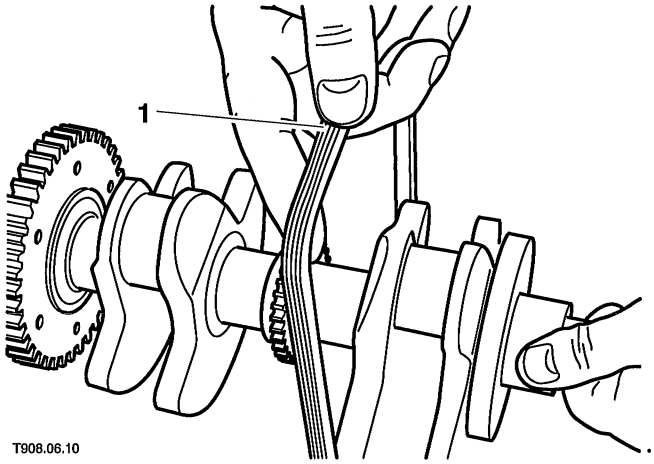
1. Locking washer
2. Retaining screw

7. Assemble the crankcase upper and lower halves.

CAM CHAIN

Removal

1. Remove the crankshaft.
2. Remove the cam chain from the crankshaft.



1. Cam chain

Installation

1. Fit the cam chain to the crankshaft sprocket.
2. Refit the crankshaft.

TRANSMISSION

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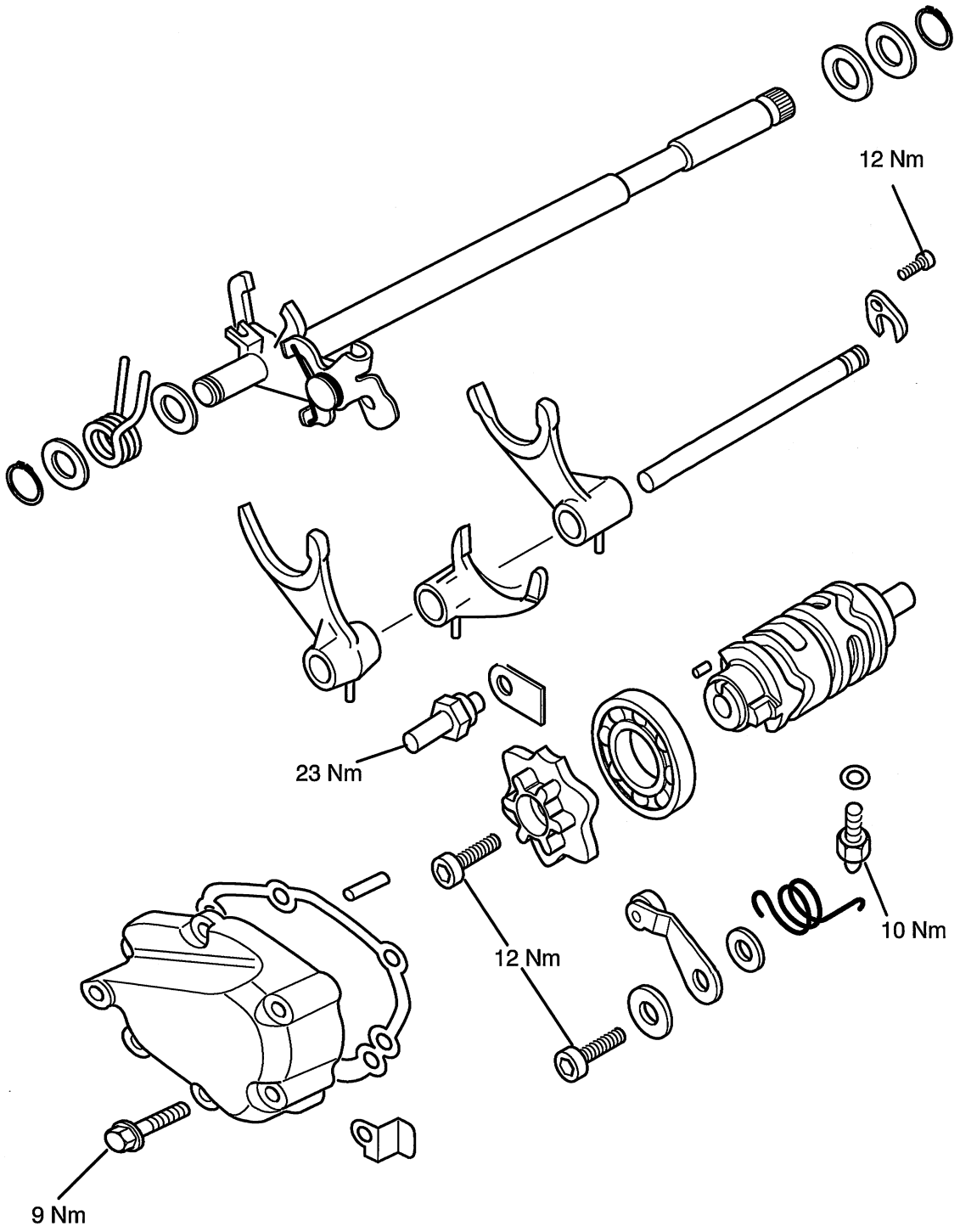
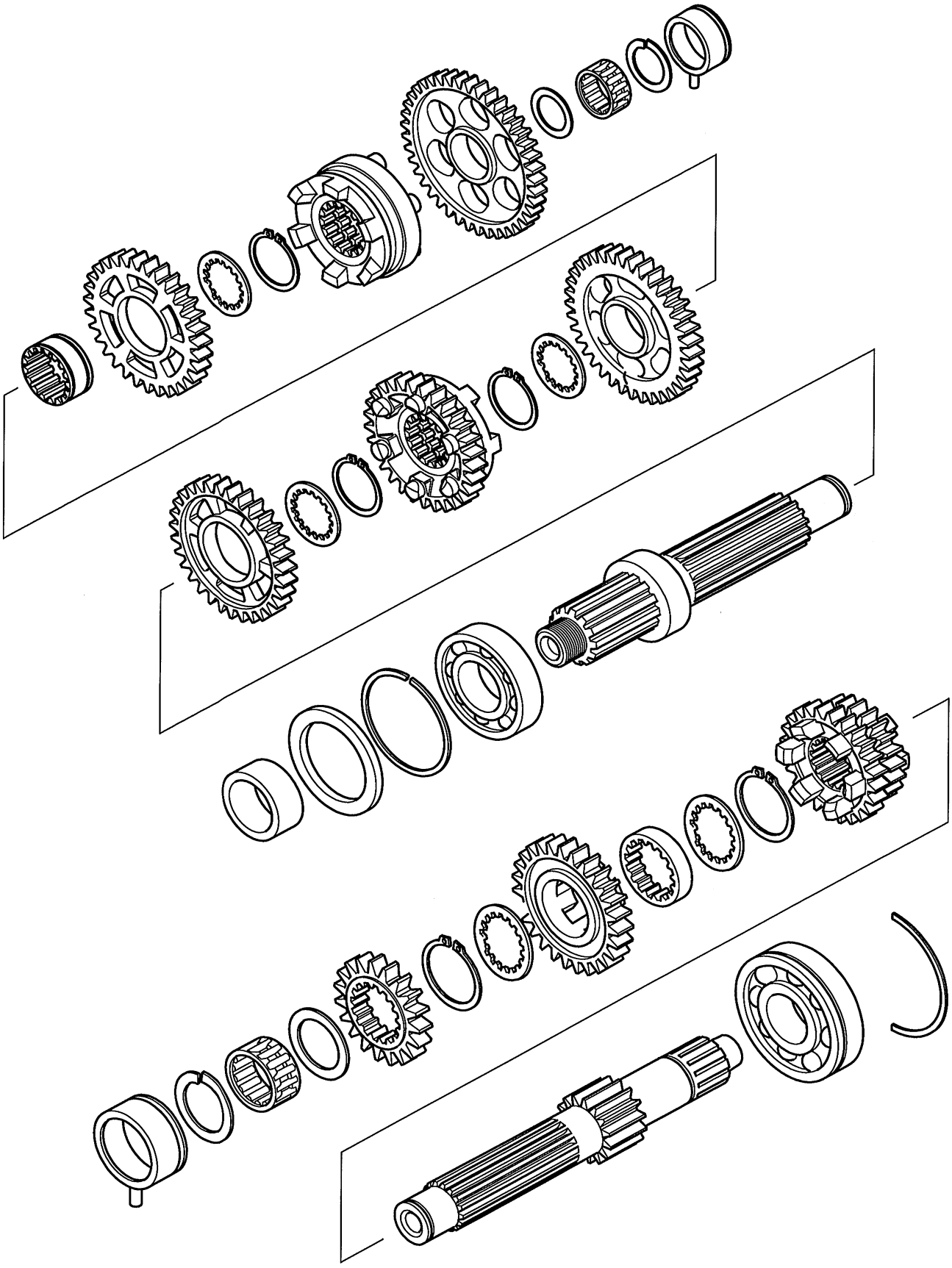
Exploded View
Gearchange and Selector Mechanism Components



Exploded View
Transmission Shafts



TRANSMISSION

WARNING: Incorrect assembly of transmission components can lead to the transmission locking completely.

Always follow the instructions given fully and accurately to ensure the transmission is correctly assembled.

A locked transmission will lead to locking of the rear wheel causing loss of motorcycle control and an accident.

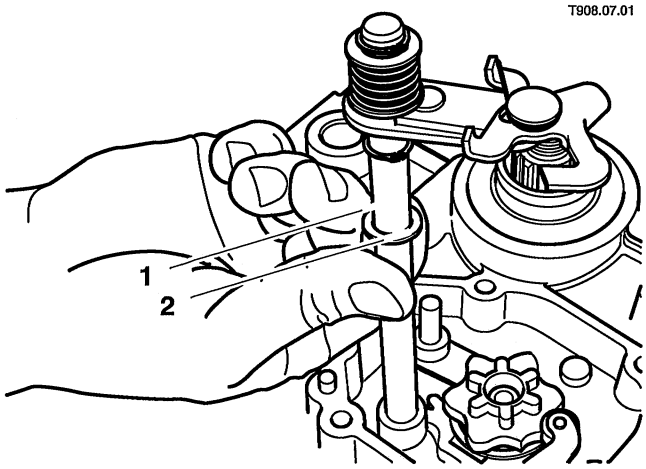
GEARCHANGE SHAFT

NOTE:

- **The gearchange shaft can be removed with the clutch in position but access to the shaft circlip is very limited. To improve access, remove the clutch assembly.**

Removal

1. Remove the clutch cover (see clutch section).
2. Remove the front sprocket (see final drive section).
3. Clean the area around the gearchange mechanism cover.
4. Slacken and remove the gearchange mechanism cover bolts, noting the correct location of the wiring clamp.
5. Remove the gearchange mechanism cover, taking care not to lose the locating pins. Discard the gasket.
6. Remove the circlip and washer from the left-hand end of the gearchange shaft.
7. Slide out the gearchange shaft complete with the second washer.



1. Gearchange shaft

2. Washer

Inspection

1. Check the change mechanism for signs of wear or damage and check the shaft for run-out. If any damage is found, renew the shaft assembly.

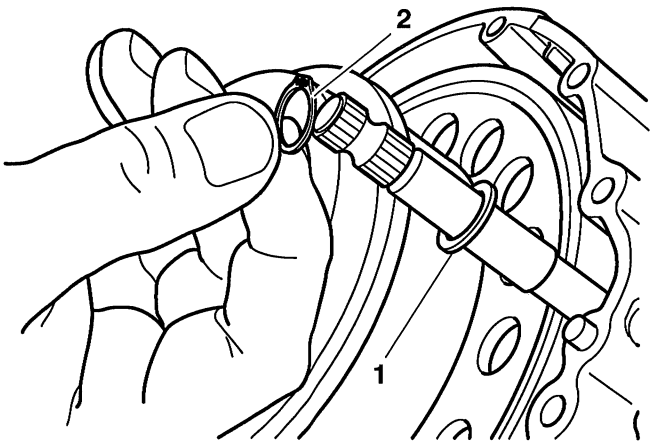
Installation

1. Ensure the detent arm is correctly installed and the gearchange shaft centralising pin is tightened to the specified torque.

2. Slide a washer onto the gearchange shaft then insert the shaft into the crankcase. Align the spring with the centralising pin and push the shaft fully into position.

3. Slide the other washer onto the left-hand end of the gearchange shaft then fit the circlip. Ensure the circlip is correctly located in the shaft groove.

T908.07.02

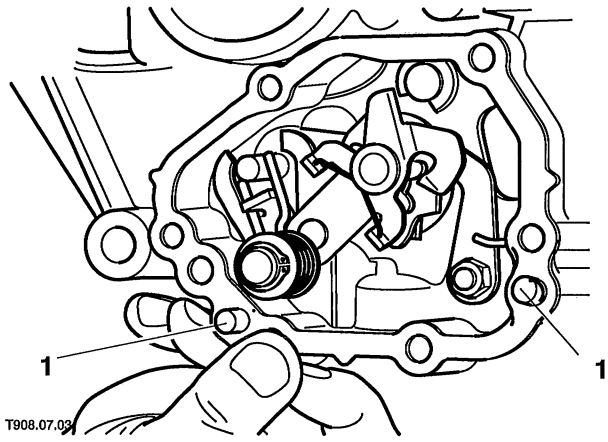


1. Washer

2. Circlip

4. Check the operation of the gearchange mechanism.

5. Ensure the locating dowels are in position then fit a **new** gasket.



1. Locating dowels

6. Fit the gearchange mechanism cover and tighten its bolts to **9 Nm** (Scrambler **12 Nm**). Ensure the wiring clip is fitted to the correct bolt.

7. Install the front sprocket (see final drive section).

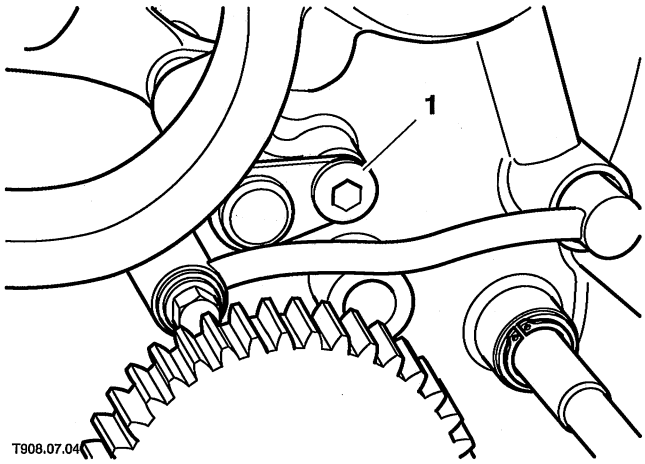
8. Refit the clutch and clutch cover (see clutch section).

SELECTOR FORKS

Removal

1. Disassemble the crankcase halves.

2. Remove the screw and slide out the retaining plate from the left-hand end of the selector fork shaft. Discard the screw.

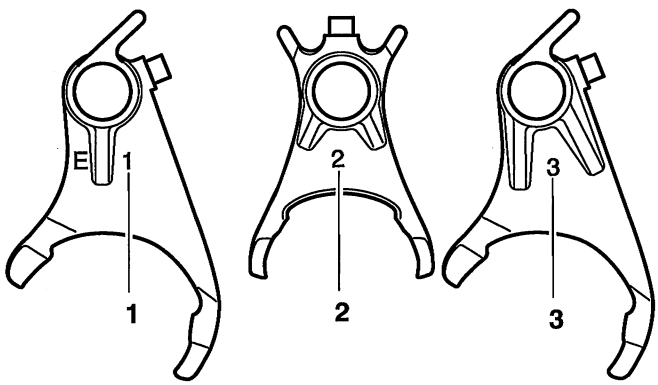


1. Retaining plate screw

3. Note the identification number on the right-hand side of each selector fork; the forks are numbered 1 to 3 from left to right.

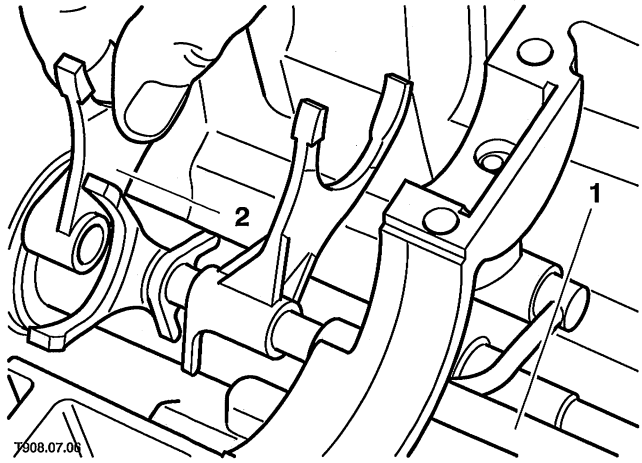
NOTE:

- **If the numbers are not clearly visible, mark each fork with a marker pen to ensure it is refitted in its original location.**
- **Selector forks from engine number 128237 are not marked.**



1. Left fork marking
2. Centre fork marking
3. Right fork marking

4. Slide out the shaft and lift out each selector fork as it is released from the shaft end.



1. Shaft

2. Selector fork

Inspection

1. Inspect the selector forks and shaft for signs of wear or damage and measure the width of the fork ends. Renew any worn components.

Selector fork end thickness

Standard	**5.80 to 5.90 mm**
Service limit	**5.70 mm**

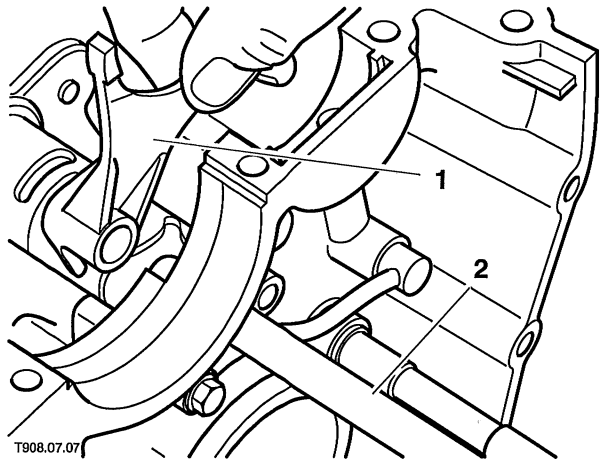
Installation

NOTE:

- **The selector forks are all different and are not interchangable.**
- **Always assemble the transmission in neutral.**

1. Fit the selector fork shaft to the crankcase, ensuring its slotted end is facing left.

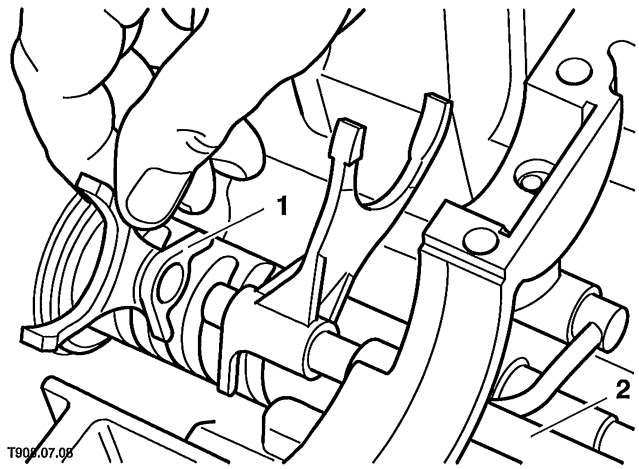
2. Fit the left-hand selector fork to the drum in the orientation previously noted. Slide the shaft into the fork.



1. Left selector fork

2. Shaft

3. Fit the centre selector fork to the drum in the orientation previously noted. Slide the shaft into the fork.



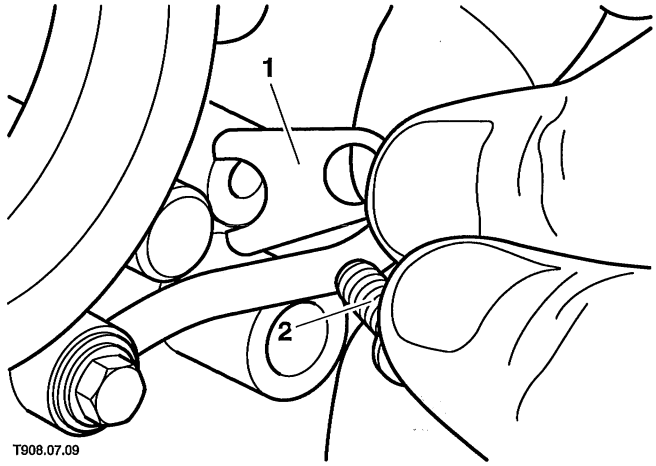
1. Centre fork

2. Shaft

4. Fit the right-hand selector fork to the drum in the orientation previously noted. Slide the shaft into the fork.

5. Slide the selector fork shaft fully into position.

6. Engage the retaining plate with the groove in the selector fork shaft then fit the **new** retaining screw. Tighten the screw to **12 Nm**.



1. Retaining plate

2. Screw

7. Reassemble the crankcase halves.

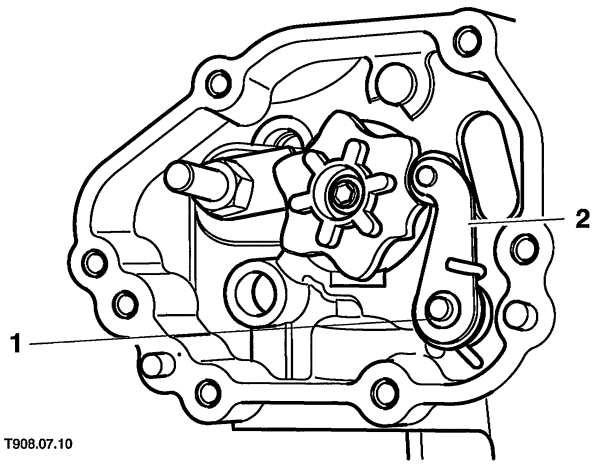
SELECTOR DRUM

Removal

NOTE:

- **The detent arm components can be removed without disassembling the crankcase halves (if required).**

1. Disassemble the crankcase halves.
2. Remove the gearchange shaft.
3. Remove the selector forks.
4. Unscrew the neutral switch from the base of the crankcase. Discard its sealing washer.
5. Slacken the detent arm bolt a few turns then carefully free the detent arm from the selector drum cam to relieve the spring pressure.

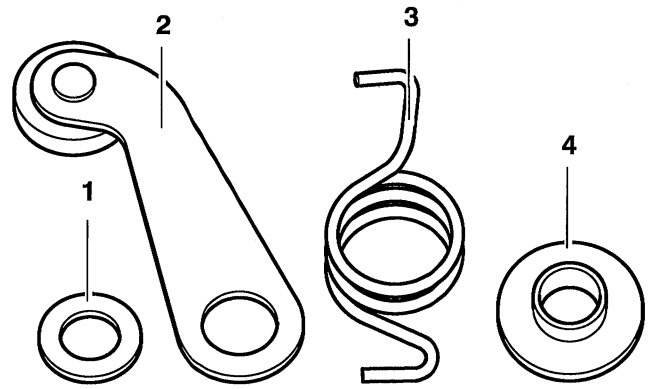


T908.07.10

1. Bolt/stud (both have been fitted during current production).

2. Detent arm

6. Remove the bolt and washer then remove the detent arm, shouldered collar and spring.



T908.07.11

1. Washer

2. Detent arm

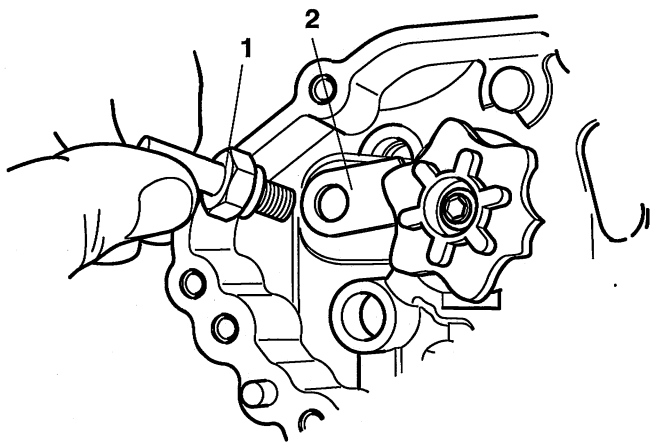
3. Spring

4. Shouldered collar

NOTE:

- **Note the orientation of the detent arm components as they are removed. The same orientation must be retained on assembly.**

7. Unscrew the gearchange shaft centralising pin and remove the selector drum retaining plate.



1. Centralising pin

2. Retaining plate

8. Prevent the drum from turning using a soft faced lever placed through the central hole in the drum itself. Slacken and remove the retaining bolt and remove the selector cam from the drum. Discard the bolt.

9. Manoeuvre the selector drum and bearing out of position by sliding the drum assembly back and forth in its housing.

Inspection

1. Check all components for signs of wear or damage, paying particular attention to the selector drum grooves. Renew any worn components.

Installation

1. Manoeuvre the selector drum into position in the crankcase then fit the bearing.

2. Fit the selector cam. Ensure the cam is correctly engaged with the pin then fit a **new** bolt, prevent the drum from turning as for removal, and tighten the new bolt to **12 Nm**.

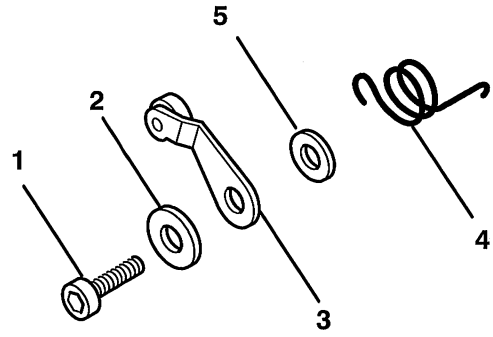
3. Engage the retaining plate with the drum bearing then refit the centralising pin. Tighten the pin to **23 Nm**.

4. Fit the spring ensuring its smaller end is facing outwards.

1. Spring

5. Fit the shouldered collar to the inside of the detent arm.

6. Engage the detent arm and collar with the spring then install the washer and **new** bolt. Screw the bolt in a few turns then locate the detent arm correctly on the selector drum cam. Ensure the arm is correctly engaged with the selector drum and shouldered collar then tighten the bolt to **12 Nm**.



1. Screw

2. Washer

3. Detent arm

4. Spring

5. Washer

7. Check the detent arm pivots smoothly and is securely held against the cam by the spring before proceeding.

8. Fit the neutral switch with a **new** sealing washer and tighten to **10 Nm**.

9. Install the selector forks and gearchange shaft.

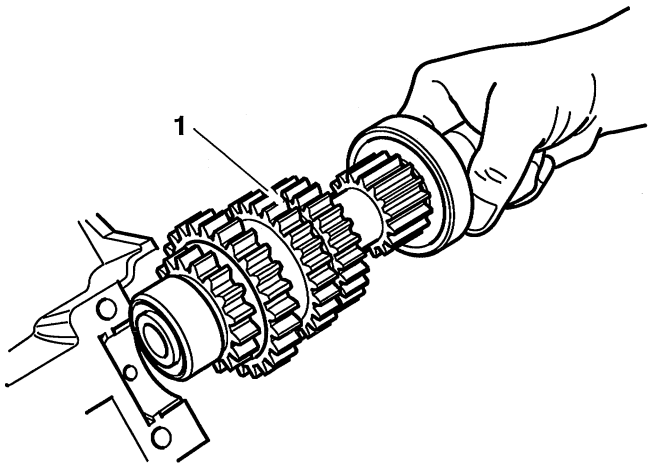
10. Reassemble the crankcase halves.

TRANSMISSION SHAFTS

Removal

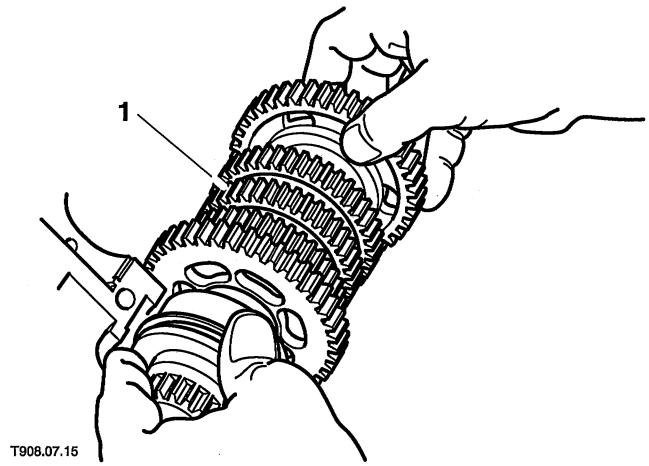
1. Disassemble the crankcase halves.

2. Lift out the input shaft. Take care not to lose the bearing outer race from the right end of the shaft or the half-ring from the left side of the crankcase.



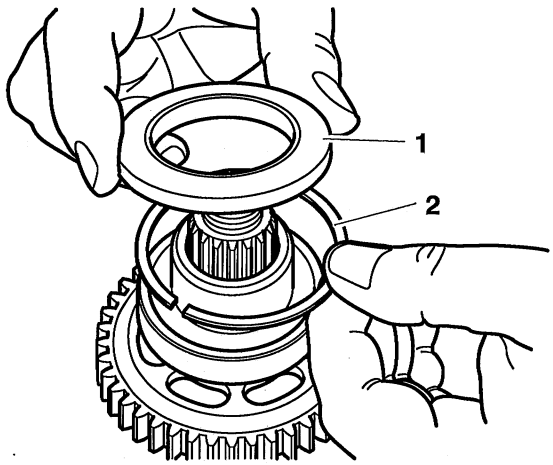
1. Input shaft

3. Lift out the output shaft taking care not to lose the bearing outer race from the left end of the shaft.



1. Output shaft

4. Remove the oil seal and retaining ring from the output shaft right end. Discard the seal.



1. Oil seal

2. Retaining ring

Inspection

1. Inspect the input and output shaft gears for signs of worn or damaged teeth, dogs or selector fork grooves. If any sign of damage is found, disassemble the shaft so that the affected components can be renewed.

Installation

NOTE:

- **Always assemble the transmission in neutral.**

1. Fit the retaining ring to the right end of the output shaft.

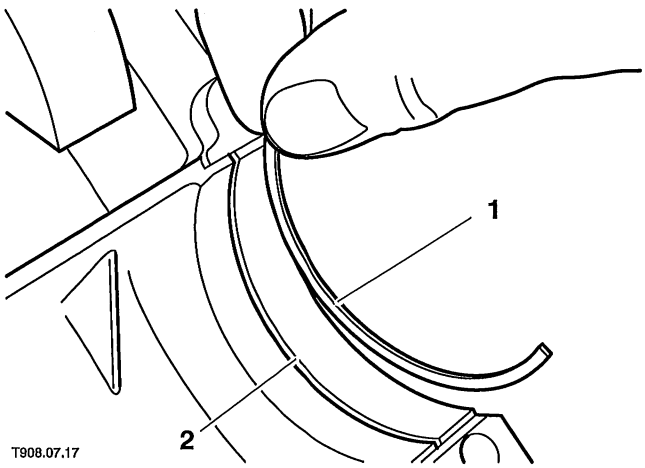
2. Lubricate the lip of the **new** oil seal with clean engine oil then ease the seal onto the output shaft spacer.

3. Ensure the bearing outer races are fitted to the shafts with their chamfered edges outermost. Also ensure the locating pin is pushed securely into each race.

4. Lower the output shaft assembly into position. As the shaft locates in the crankcase, align the pin in the bearing outer race with its hole and the retaining ring and oil seal lip with their crankcase grooves.

5. Ensure the output shaft is correctly located.

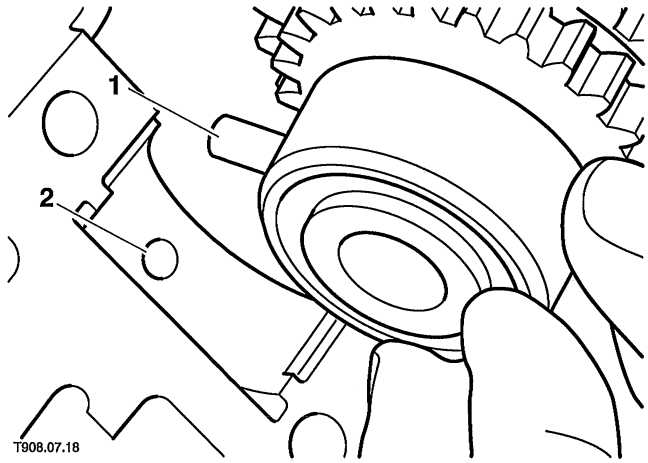
6. Fit the input shaft bearing half-ring to its groove in the crankcase.



1. Half-ring

2. Crankcase groove

7. Lower the input shaft into position aligning the pin in the bearing outer race with the crankcase hole and the bearing groove with the half-ring.



1. Outer race pin

2. Crankcase hole

8. Ensure both the output and input shafts are correctly seated and their gears are correctly meshed before assembling the crankcase halves.

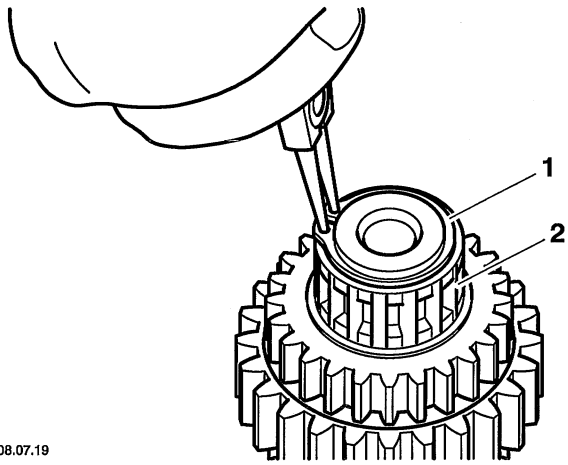
INPUT SHAFT

NOTE:

- **Note the orientation of all components as they are removed from the shaft. The same orientation must be retained on assembly.**

Disassembly

1. Remove the input shaft from the crankcase.
2. Remove the bearing outer race from the right end of the shaft.
3. Remove the circlip then slide off the needle roller bearing.

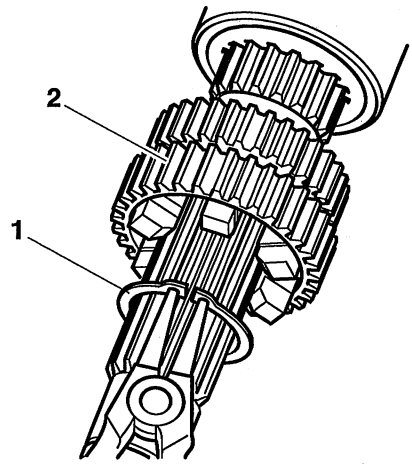


T908.07.19

1. Circlip

2. Needle roller bearing

4. Remove the washer followed by the 2nd gear.
5. Remove the circlip then slide off the splined washer.
6. Remove the 5th gear then slide off its splined bush and splined washer.
7. Remove the circlip and slide off the combined 3rd/4th gear.



T908.07.20

1. Circlip

2. 3rd/4th gear

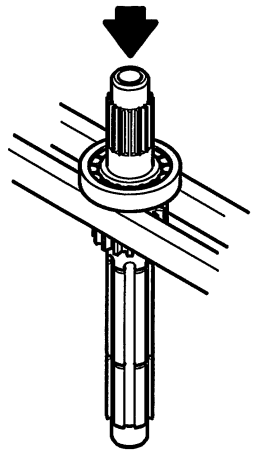
8. To separate the input shaft and bearing, support the bearing then press out the shaft.

NOTE:

- **The bearing must be renewed if it is removed from the shaft.**

WARNING: When using a press, always wear overalls, eye, face and hand protection. Objects such as bearings can break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.



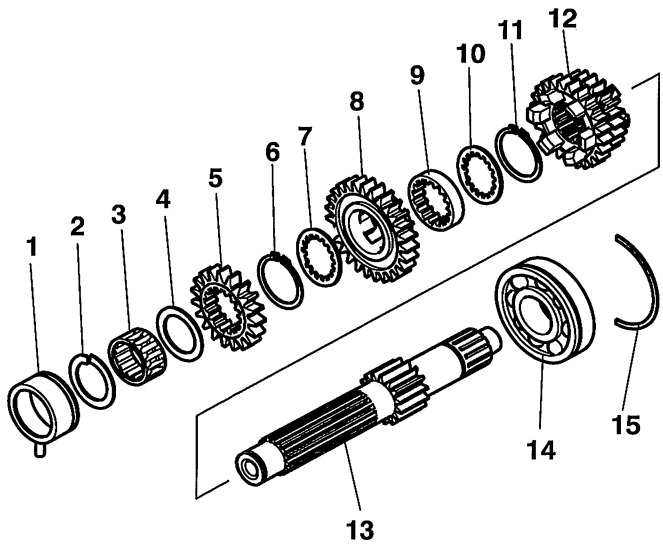
06.12-1

Pressing off the input shaft bearing

Inspection

1. Examine all gears, bearings and bushes for damage, chipped teeth and wear beyond the service limits. Replace all suspect components and always use new circlips to assemble the shaft.

Assembly



Input shaft components
1. Outer race
2. Circlip
3. Needle roller bearing
4. Washer
5. 2nd gear
6. Circlip
7. Splined washer
8. 5th gear
9. 5th gear splined bush
10. Splined washer
11. Circlip
12. 3rd/4th gear
13. Input shaft
14. Bearing
15. Half-ring

NOTE:

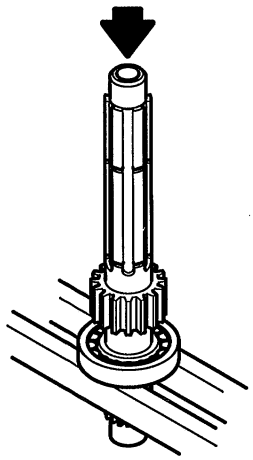
- **Lubricate each gear and bush with clean engine oil during assembly.**
- **The circlips used on the input shaft have a flat side and an angled side. Illustrations throughout the assembly text indicate which way the angled side should face.**

1. Support the inner race of the **new** bearing, ensuring its ring groove is facing upwards

2. Locate the input shaft in the bearing, with its clutch end facing downwards. Press the shaft into position until its integral 1st gear contacts the bearing.

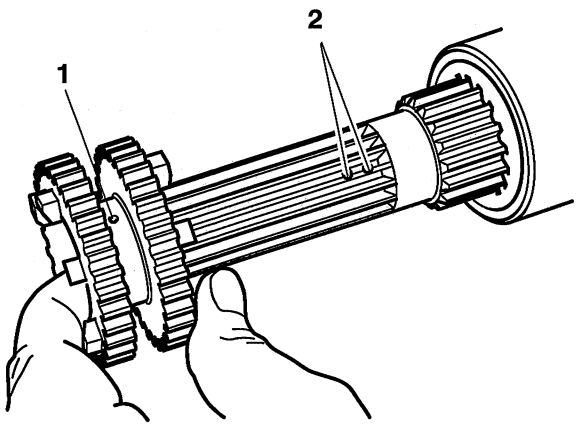
WARNING: When using a press, always wear overalls, eye, face and hand protection. Objects such as bearings can break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.



Pressing on the bearing

3. Fit the combined 3rd/4th gear with its smaller 3rd gear facing the integral 1st gear. Ensure that, when engaging the gear with the shaft splines, the oil hole in the gear DOES NOT ALIGN with the oil holes in the shaft.

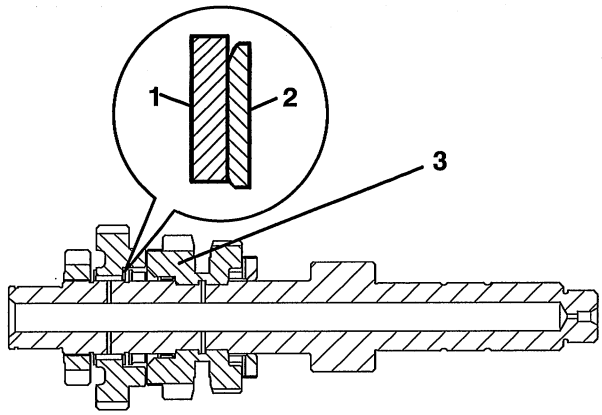


T908.07.21

1. 3rd/4th gear oil hole

2. Shaft oil holes

4. Secure the 3rd/4th gear in position with a **new** circlip, orientating the circlip as shown below.



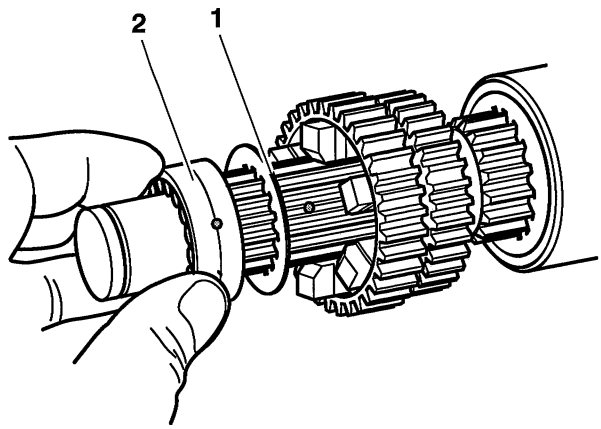
ccql

1. Splined washer

2. Circlip

3. 3rd/4th gear

5. Fit the splined washer then slide on the 5th gear splined bush taking care to ALIGN THE OIL HOLE IN THE SHAFT WITH THE CORRESPONDING HOLE IN THE BUSH.



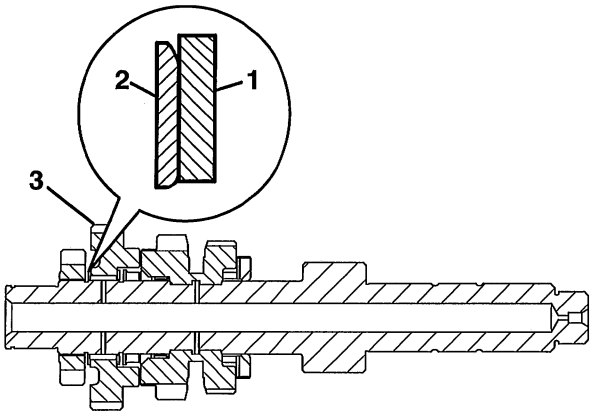
T908.07.22

1. Splined washer

2. 5th gear splined bush

6. Fit the 5th gear with its dogs facing the 3rd/4th gear and locate it on the bush.

7. Fit a splined washer and secure 5th gear in position with a **new** circlip, orientating the circlip as shown below.

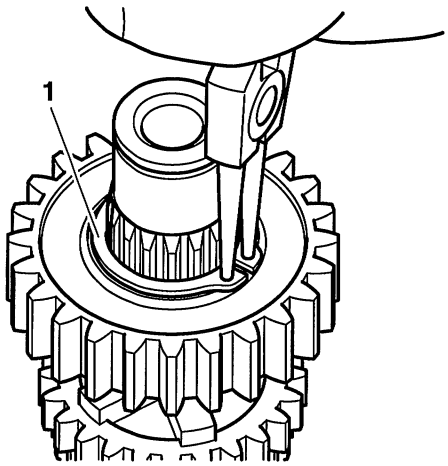


ccql

1. Splined washer

2. Circlip

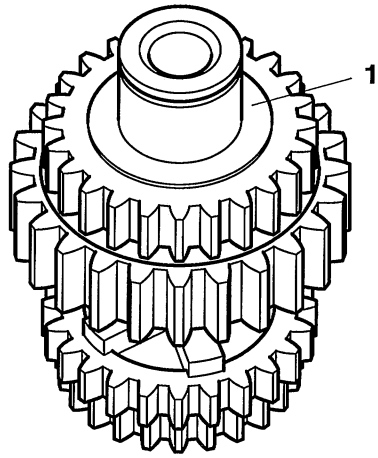
3. 5th gear



T908.07.23

1. Circlip

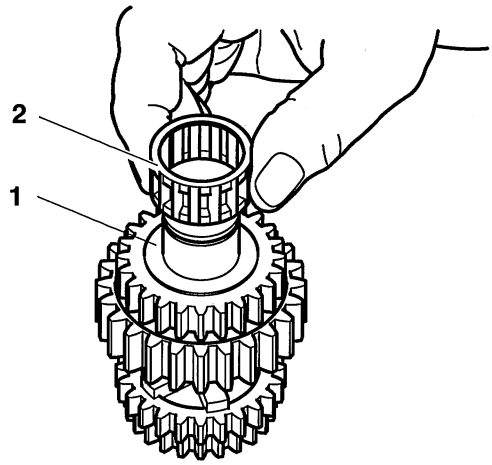
8. Fit the 2nd gear with its side with the slight protrusion facing away from the 5th gear.



T908.07.24

1. 2nd gear protrusion

9. Slide on the washer and fit the needle roller bearing.

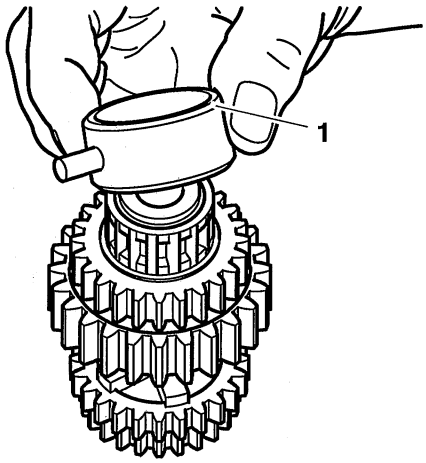


T908.07.25

1. Washer
2. Needle roller bearing

10. Secure the needle roller bearing in position with a **new** circlip. Ensure the circlip is correctly located in the shaft groove.

11. Fit the outer race to the needle roller bearing ensuring its chamfered edge is facing outwards.



T908.07.26

1. Outer race chamfered edge

OUTPUT SHAFT

NOTE:

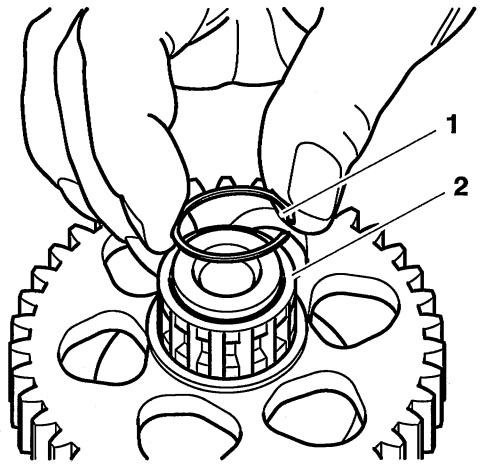
- **Note the orientation of all components as they are removed from the shaft. The same orientation must be retained on assembly.**

Disassembly

1. Remove the output shaft from the crankcase.

2. Remove the bearing outer race from the left end of the shaft.

3. Remove the circlip then slide off the needle roller bearing.



T908.07.27

1. Circlip

2. Needle roller bearing

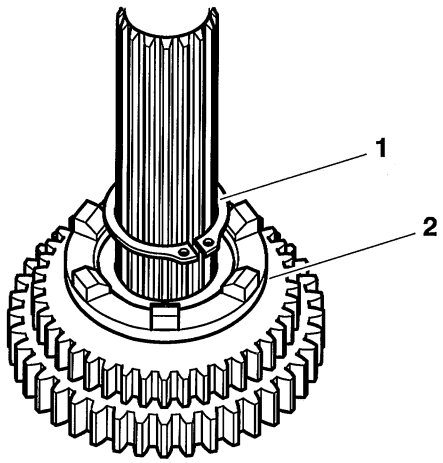
4. Remove the washer followed by the 1st gear.

5. Slide off 1st/3rd gear selector.

6. Remove the circlip then slide off the splined washer.

7. Remove the 3rd gear followed by the 4th gear then slide off the 3rd/4th gear splined bush and splined washer.

8. Remove the circlip and slide off the 5th gear.



T908.07.28

1. Circlip

2. 5th gear

9. Remove the circlip and splined washer then slide off the 2nd gear.

10. To separate the output shaft, bearing and spacer, support the bearing then press the shaft out of position.

NOTE:

- **The bearing must be renewed if it is removed from the shaft.**

WARNING: When using a press, always wear overalls, eye, face and hand protection. Objects such as bearings can break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.

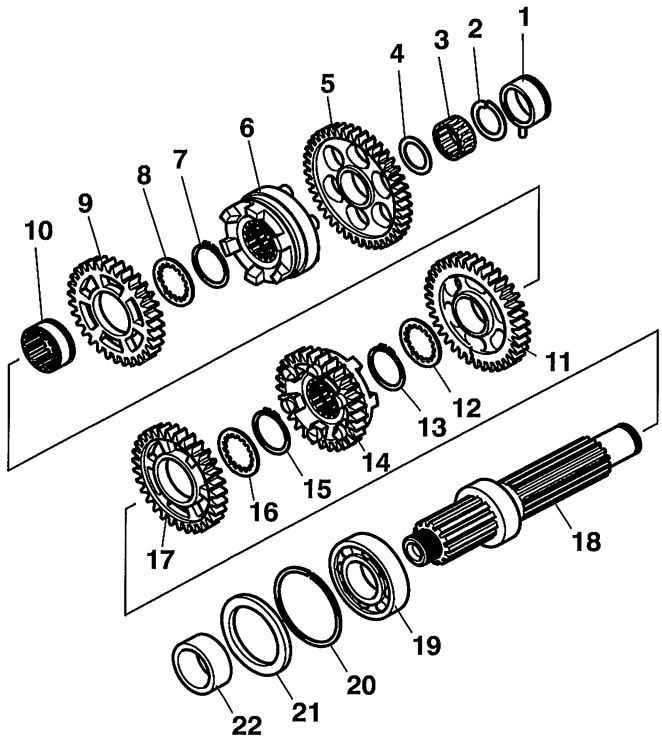
Inspection

1. Examine all gears, bearings and bushes for damage and wear beyond the service limits. Replace all damaged components and always use new circlips to assemble the shaft.

NOTE:

- **Always assemble the transmission in neutral.**

Assembly



Output shaft components

1. Outer race
2. Circlip
3. Needle roller bearing
4. Washer
5. 1st gear
6. 1st/3rd gear selector
7. Circlip
8. Splined washer
9. 3rd gear
10. 3rd/4th gear splined bush
11. 4th gear
12. Splined washer
13. Circlip
14. 5th gear
15. Circlip
16. Splined washer
17. 2nd gear
18. Output shaft
19. Bearing
20. Retaining ring
21. Oil seal
22. Spacer

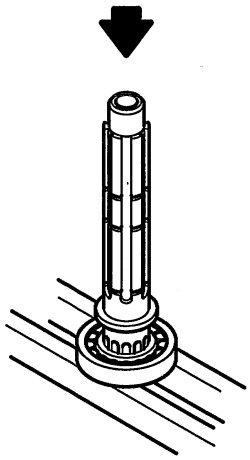
NOTE:

- **Lubricate each gear and bush with clean engine oil during assembly.**
- **The circlips used on the output shaft have a flat side and an angled side. Illustrations throughout the assembly text indicate which way the angled side should face.**

1. Support the inner race of the **new** bearing, and locate the output shaft in the bearing, with its sprocket end facing downwards. Press the shaft into position until its shoulder contacts the bearing.

WARNING: When using a press, always wear overalls, eye, face and hand protection. Objects such as bearings can break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

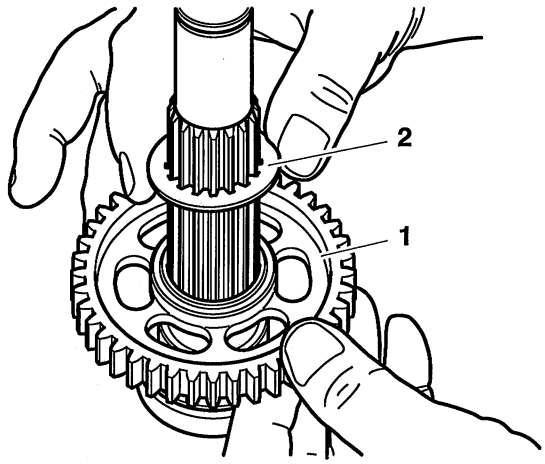
Never wear loose clothing, which could become trapped in the press and cause crushing injury to the hand, arms or other parts of the anatomy.



Pressing on the bearing

2. With the bearing correctly fitted, support the spacer then press the output shaft into position until the spacer contacts the bearing.

3. Slide the 2nd gear onto the shaft ensuring its recessed face is facing away from the bearing.

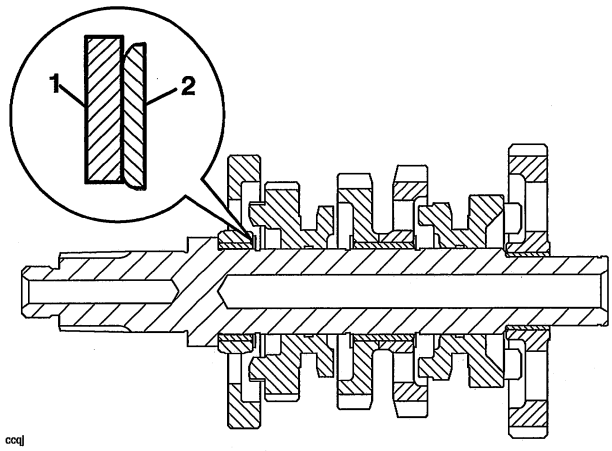


T908.07.29

1. 2nd gear

2. Splined washer

4. Fit the splined washer and secure it in position with a **new** circlip, orientating the circlip as shown below.

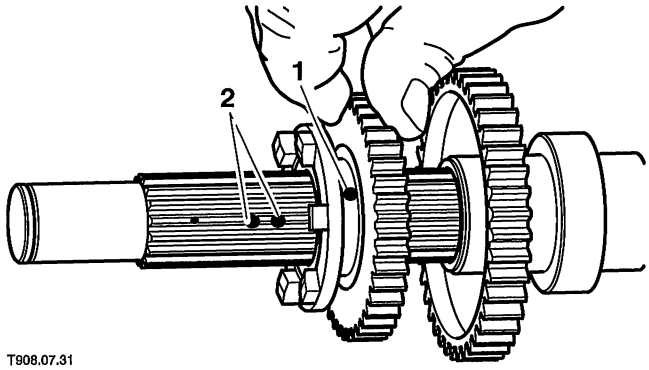


ccqj

1. Splined washer

2. Circlip

5. Fit the 5th gear with its selector fork groove facing away from the 2nd gear. Ensure that, when engaging the gear with the shaft splines, the oil holes in the gear DO NOT ALIGN with the oil holes in the shaft.

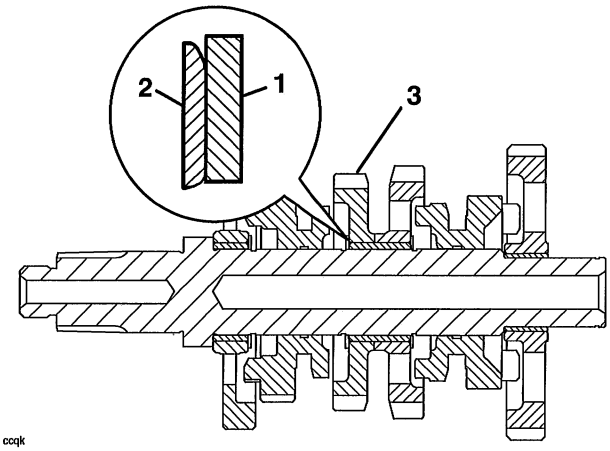


T908.07.31

1. 5th gear oil hole

2. Shaft oil holes

6. Fit a **new** circlip, orientating the circlip as shown below.



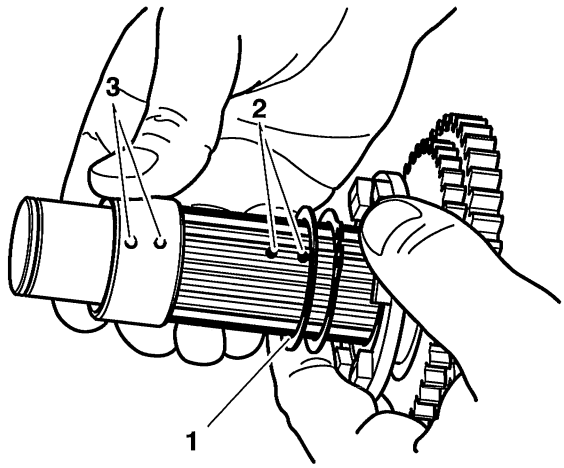
ccqk

1. Splined washer

2. Circlip

3. 5th gear

7. Fit the splined washer then slide on the 3rd/4th gear splined bush taking care to ALIGN the oil hole in the shaft with the corresponding hole in the bush.



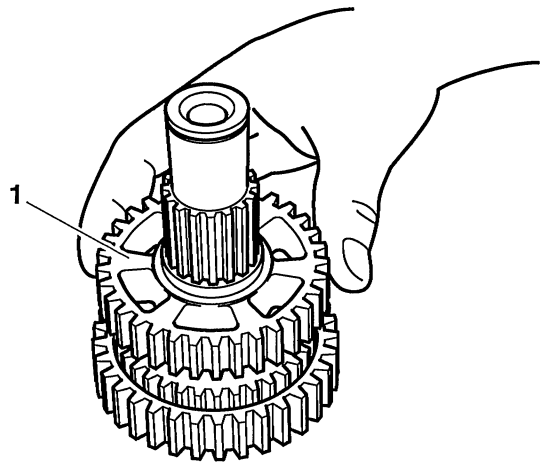
T908.07.32

1. Splined washer

2. Shaft oil holes

3. 3rd/4th gear bush oil holes

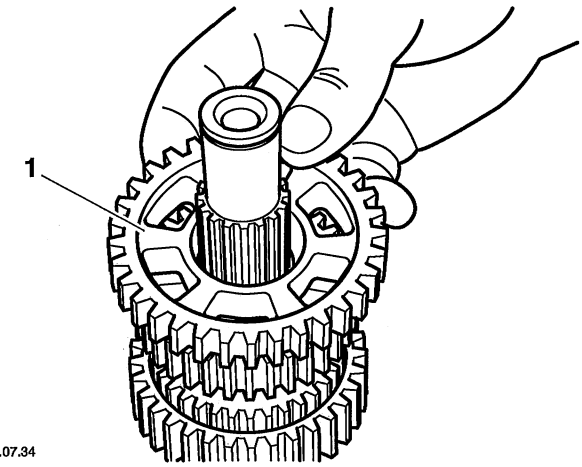
8. Slide the 4th gear onto the bush so its raised hub faces away from 5th gear.



T908.07.33

1. 4th gear

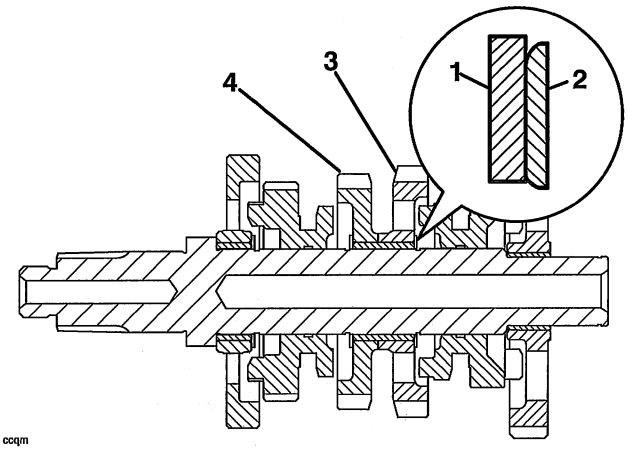
9. Fit the 3rd gear onto the bush with its raised hub facing towards 4th gear.



T908.07.34

1. 3rd gear

10. Fit a splined washer then secure 3rd/4th gear in position with a **new** circlip, orientating the circlip as shown below.



ccqm

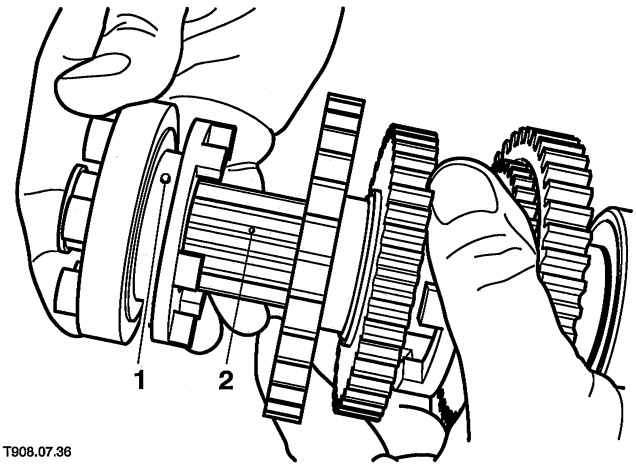
1. Splined washer

2. Circlip

3. 3rd gear

4. 4th gear

11. Fit the 1st/3rd gear selector with its selector fork groove facing towards the 3rd gear. Ensure that the oil hole in the selector DOES NOT ALIGN with the oil hole in the shaft.

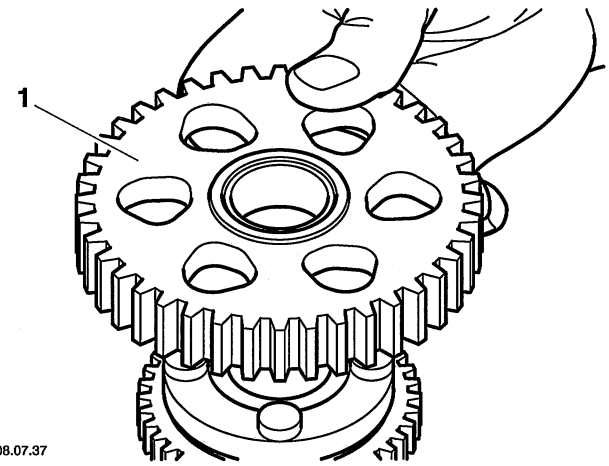


T908.07.36

1. 1st/3rd gear selector oil hole

2. Shaft oil hole

12. Fit the 1st gear with its recessed face towards the 1st/3rd gear selector.



T908.07.37

1. 1st gear

13. Slide on the washer and fit the needle roller bearing.

14. Secure the needle roller bearing in position with a **new** circlip. Ensure the circlip is correctly located in the shaft groove.

15. Fit the outer race to the needle roller bearing ensuring its chamfered edge is facing outwards.

LUBRICATION SYSTEM

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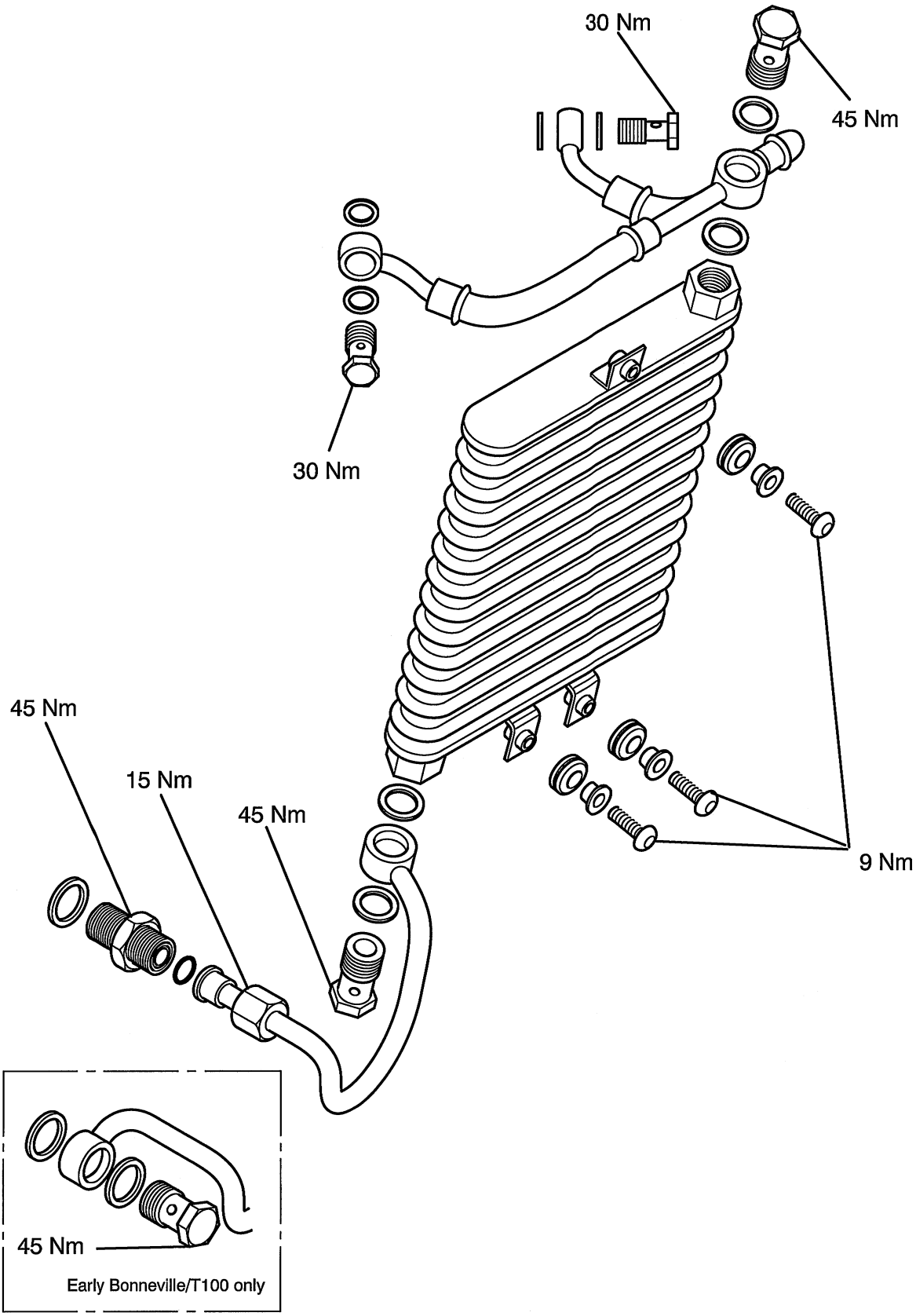
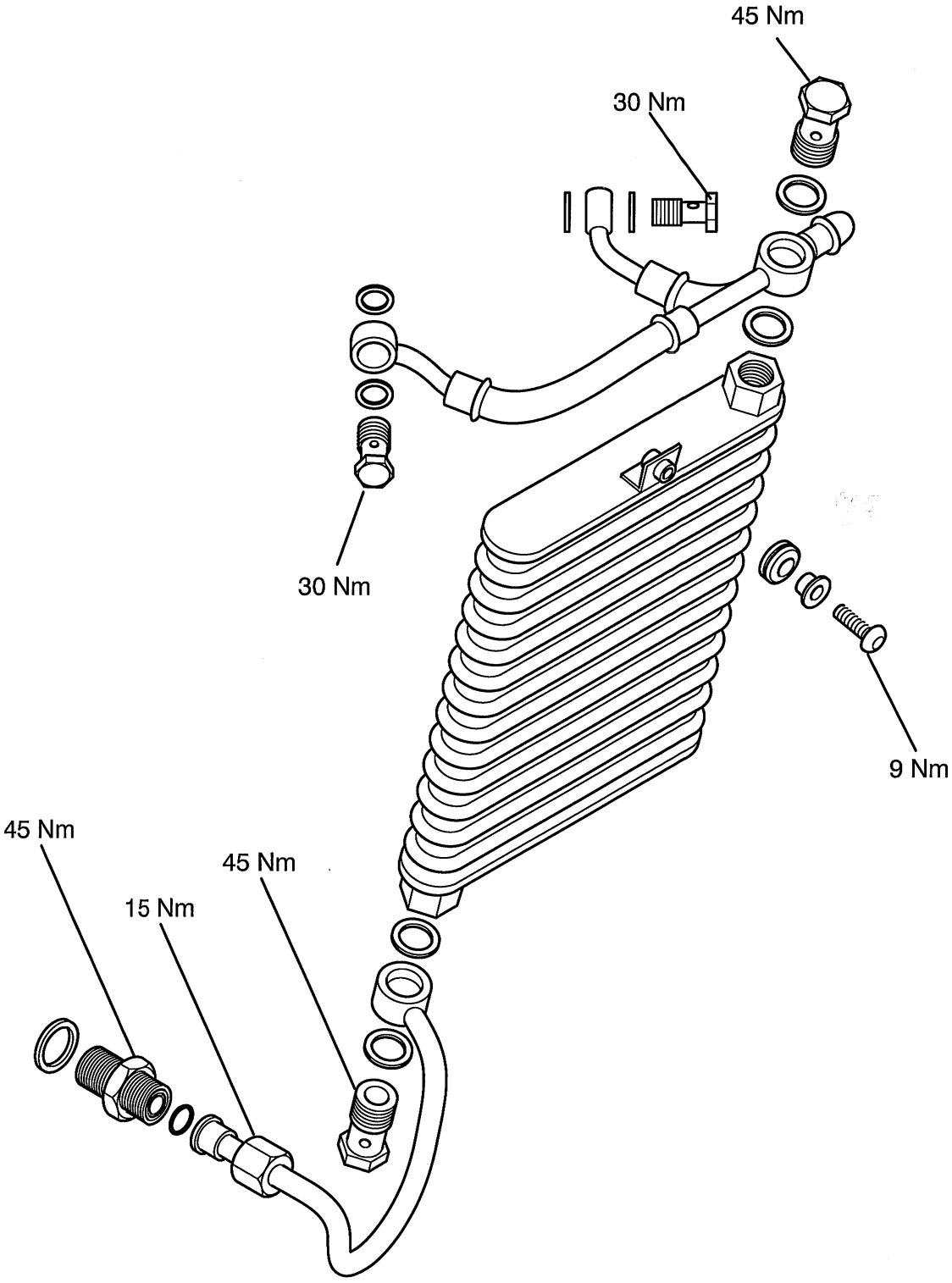
Exploded View

Oil Cooler and Fittings - Bonneville, Bonneville T100, Scrambler & Thruxton



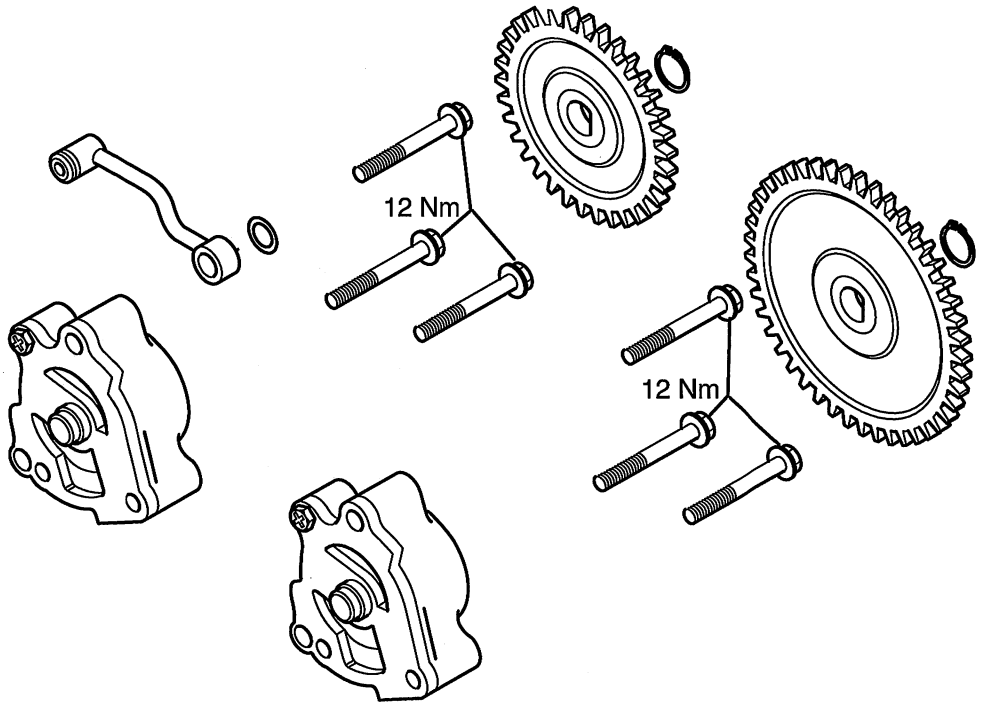
Exploded View

Oil Cooler and Fittings - America, and Speedmaster



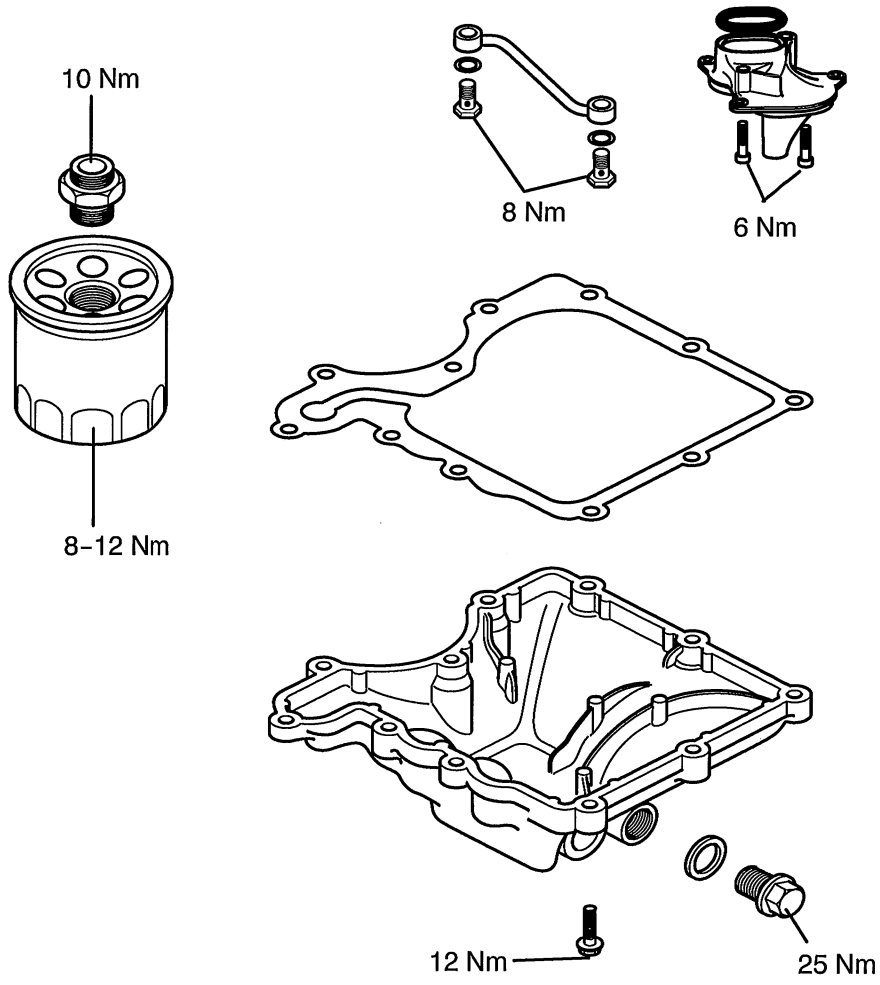
Exploded View

Oil pumps - All Models



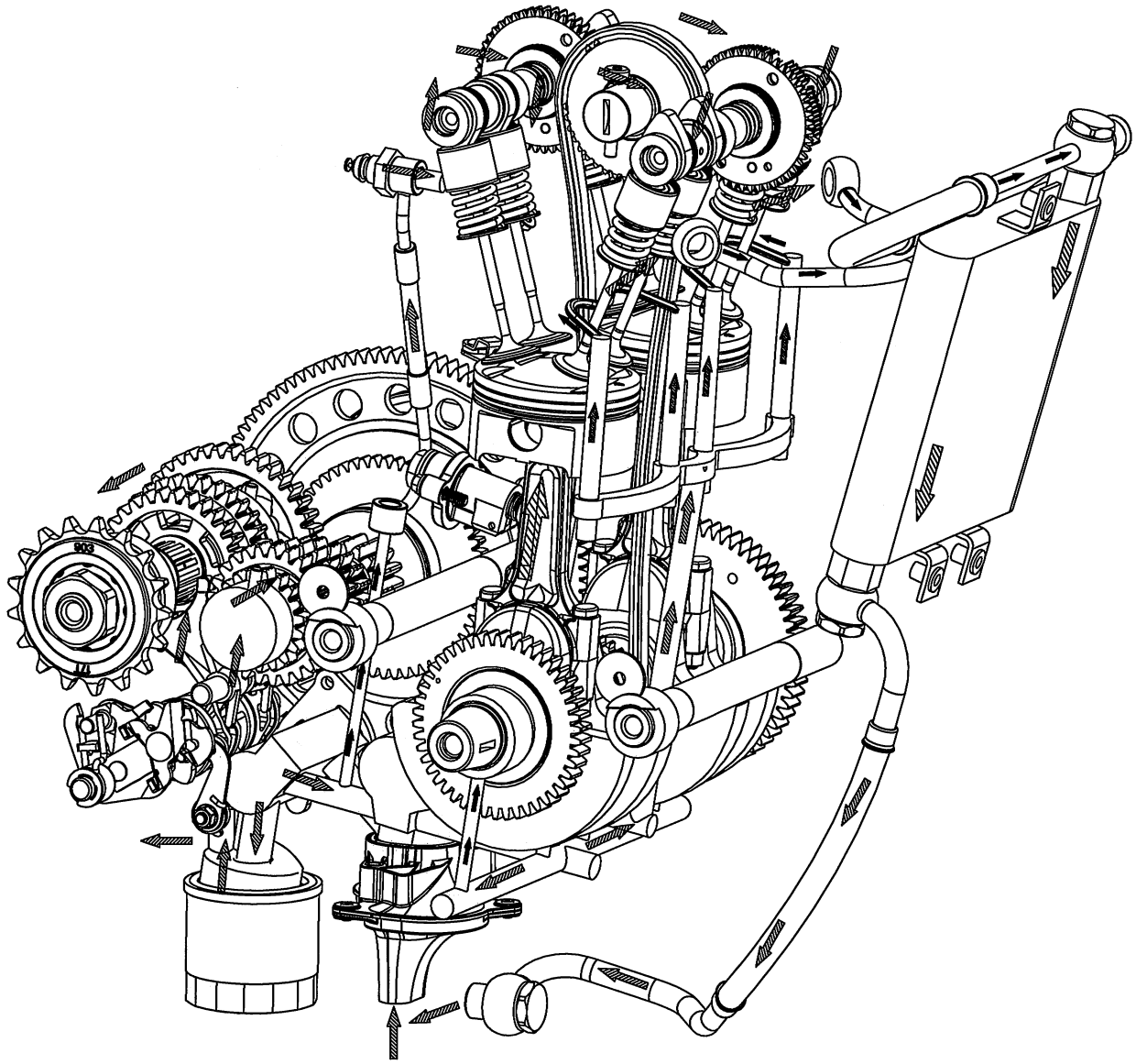
Exploded View

Sump and Oil Filter - All Models



GENERAL DESCRIPTION

The lubrication system is operated by a dual oil pump arrangement; the rear oil pump is the main lubrication pump and the front pump lubricates the input shaft/clutch assembly and circulates oil around the oil cooler.



T908.03.06

Rear oil pump

The rear pump collects oil from the sump via the pick-up strainer and feeds pressurised oil along an internal passage to the oil filter. This passage houses the pressure relief valve which is screwed into the crankcase. The oil pressure relief valve is set to open at 5.2 bar (73 psi) and, when open, returns oil directly to the sump.

After leaving the oil filter, the oil enters the main oil gallery in the crankcase. From here, oil is distributed to the cylinder head and crankshaft.

Vertical drillings from the main oil gallery feed oil to the four main bearings. The crankshaft is cross-drilled to feed oil from the main bearings to the big-end bearings.

From the centre of the main oil gallery, oil is fed via an external pipe to the rear of the cylinder head. The low oil pressure warning light switch is located at the upper end of this pipe. Within the cylinder head, an oil pipe and drillings feed oil to the camshafts which lubricate the camshafts, tappet buckets and valves. Spill oil returns via the cam chain area to the sump, lubricating the cam chain in the process.

The transmission output shaft is fed with oil direct from the pump, via a metal pipe. The output shaft is both drilled through its length and cross-drilled, the drillings provide oil directly to the gears and bearings.

Front oil pump

The front pump collects oil from the sump via the pick-up strainer and feeds pressurised oil along an internal crankcase passage to the front of the barrels.

The oil is circulated around the passages on the outside of the cylinder bores then travels up the cylinder head stud bores to the cylinder head passages which are situated around the combustion chambers and exhaust ports. The oil cools the cylinder bores and head then exits the head through the drillings located directly above the exhaust ports.

From the cylinder head, the oil travels through the feed pipe to the top of the oil cooler. The oil then passes down through the oil cooler, where it is cooled by the passing airflow, and returns to the sump via the return pipe.

As well as circulating oil around the oil cooler, the front pump also lubricates the transmission input shaft. The feed to the shaft is taken off the crankcase passage via the metal pipe on the base of the lower crankcase. The input shaft is both drilled through its entire length and cross-drilled. The drillings provide oil directly to the gears and bearings. Oil flowing through the centre of the shaft exits at the clutch end providing oil to the clutch assembly.

ENGINE OIL SPECIFICATION

Use semi or fully synthetic 10W/40 or 15W/50 motorcycle engine oil which meets specification API SH (or higher) and JASO MA, such as Mobil 1 Racing 4T.

CAUTION: Triumph high performance fuel injected engines are designed to use semi or fully synthetic motorcycle engine oil which meets specification API SH (or higher) AND JASO MA.
Do not add any chemical additives to the engine oil. The engine oil also lubricates the clutch and any additives could cause the clutch to slip.
Do not use mineral, vegetable, non-detergent oil, castor based oils or any oil not conforming to the required specification. The use of these oils may cause instant, severe engine damage.
Ensure no foreign matter enters the crankcase during an oil change or top-up.

TRIUMPH ENGINE OIL

Your Triumph Motorcycle is a quality engineered product which has been carefully built and tested to exacting standards. Triumph Motorcycles are keen to ensure that you enjoy optimum performance from your machine and with this objective in mind have tested many of the engine lubricants currently available to the limits of their performance.

Mobil 1 Racing 4T consistently performed well during our tests and has become our primary recommendation for the lubrication of all current Triumph motorcycle engines.

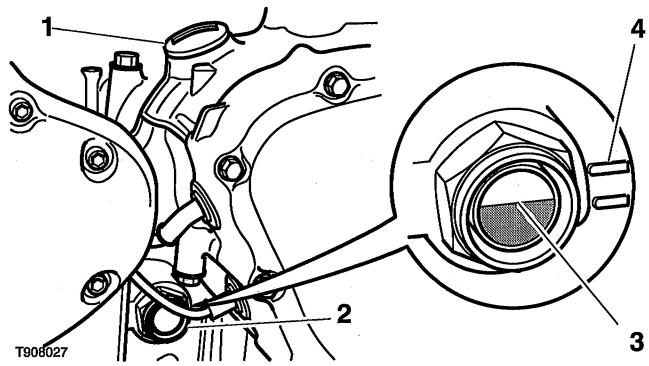
Mobil 1 Racing 4T, specially filled for Triumph, is available from your authorised Triumph dealer.

OIL LEVEL CHECK

NOTE:

- **The motorcycle must be level and upright when checking the oil level.**

1. If the engine has been running, allow it to stand for a few minutes before checking the oil level.
2. Ensure the motorcycle is level and upright then check the oil level in the inspection window on the right-hand side of the crankcase.
3. The oil level must be in-between the upper and lower level marks located at the side of the window.



1. Oil filler cap
2. Oil level inspection window
3. Oil level (correct level shown)
4. Level marks

WARNING: On Scrambler, the oil filler cap is close to the exhaust system. If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the system to cool, as touching any part of a hot exhaust could cause burn injuries.

4. If topping-up is necessary, unscrew the filler cap from the top of the crankcase. Add the specified oil a little at a time until the correct oil level is established.

CAUTION: Do not overfill the engine with oil. If the oil level is above the upper level line, the excess oil must be drained off to prevent possible engine damage.

5. Once the level is correct, securely refit the filler cap and O-ring to the crankcase.

OIL DRAINING AND REFILLING

Draining

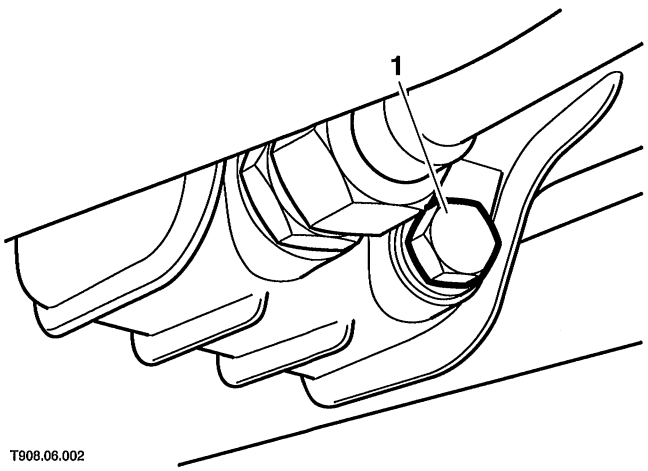
WARNING: Prolonged or repeated contact with engine oil can lead to skin dryness, irritation and dermatitis. Furthermore, used engine oil contains potentially harmful contaminants which can cause cancer.

When handling used engine oil, always wear protective clothing and avoid any skin contact with the oil.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. If the engine has been running, allow it to stand for a few minutes to allow the oil and engine components to cool.
2. Position the motorcycle on level ground.
3. Place a suitable container beneath the sump plug to collect the displaced oil.

WARNING: If the engine has been running, the exhaust pipes and oil maybe hot. Take great care to avoid being scalded or burnt.



T908.06.002

1. Sump drain plug

4. Remove the sump drain plug and allow the oil to drain out completely. Discard the sealing washer. Hold the motorcycle upright whilst the oil drains.
5. When the oil has completely drained out, fit a **new** sealing washer to the sump plug. Refit the plug tightening it to **25 Nm.**

CAUTION: Do not pour engine oil on the ground, down sewers or drains, or into water courses. To prevent pollution of water courses etc., dispose of used oil sensibly. If in doubt contact your local authority

Refilling

WARNING: On Scrambler, the oil filler cap is close to the exhaust system. If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the system to cool, as touching any part of a hot exhaust could cause burn injuries.

1. Remove the filler cap and fill the engine with oil of the correct specification and viscosity.

NOTE:

- **Add oil slowly to avoid overfilling or spillage over the outside of the engine.**

2. Once the oil level is up to the upper level mark on the inspection window, refit the filler cap and O-ring.
3. Start the engine and allow it to run for a short time at idle. Check that the low oil pressure warning light extinguishes shortly after starting.

CAUTION: Stop the engine if the low oil pressure warning light fails to extinguish.

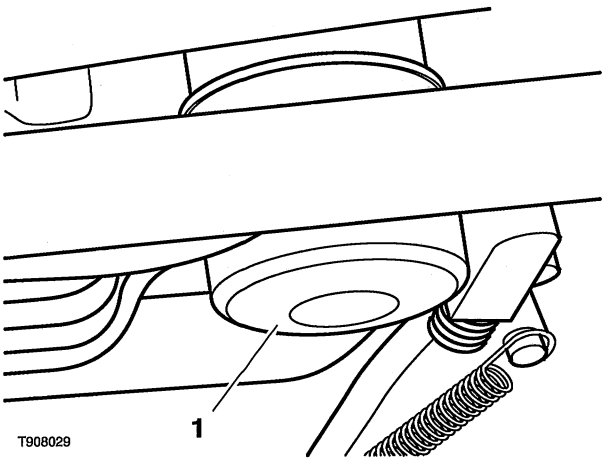
Investigate and rectify the cause before restarting the engine. Running the engine with the low oil pressure warning light illuminated will cause engine damage.

4. Check for oil leaks then stop the engine.
5. Check the oil level and if necessary top-up.

OIL AND FILTER CHANGE

WARNING: Before staring work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Drain the engine oil.
2. Position the container beneath the oil filter.
3. Using tool T3880312, unscrew and remove the oil filter from the engine.



1. Oil filter

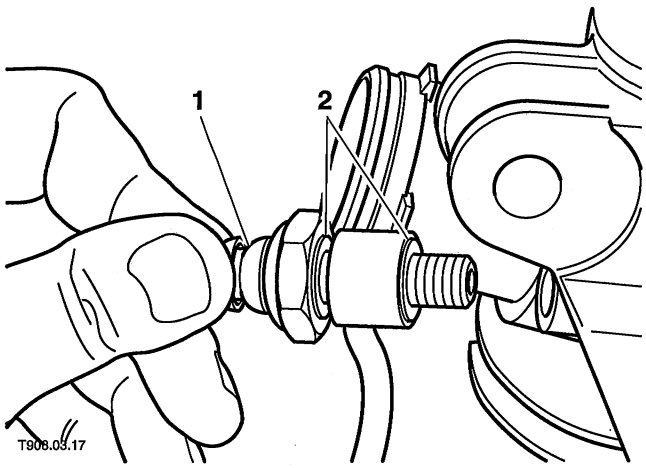
4. Apply a smear of clean engine oil to the seal of the new filter and fill the filter with clean engine oil.
5. Wipe clean the crankcase surface then fit the filter. Tighten the filter to **8-12 Nm** using tool T3880312.
6. Refill the engine with clean oil of the correct specification.

LOW OIL PRESSURE WARNING LIGHT SWITCH

Removal

WARNING: Before staring work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the seat.
2. Disconnect the battery, disconnecting the negative (-) terminal first.
3. Peel back the rubber boot to gain access to the switch terminal.
4. Slacken and remove the screw and disconnect the wiring terminal from the switch.
5. Unscrew the switch from the rear of the cylinder head and remove it. Recover the sealing washers from the oil feed pipe and discard them.



1. Low oil pressure warning light switch
2. Sealing washers

Installation

1. Position a **new** sealing washer on each side of the oil feed pipe end fitting then screw in the oil pressure switch. Tighten the switch to **13 Nm.**
2. Securely reconnect the wiring connector to the switch, then seat the rubber boot in position.
3. Reconnect the battery, connecting the positive (+) terminal first, then install the seat.
4. Check the engine oil level and top-up if necessary
5. Start the engine and check for oil leaks.

OIL COOLER

Bonneville, Bonneville T100, Scrambler & Thruxton

WARNING: Prolonged or repeated contact with engine oil can lead to skin dryness, irritation and dermatitis. Furthermore, used engine oil contains potentially harmful contaminants which can cause cancer.

When handling used engine oil, always wear protective clothing and avoid any skin contact with the oil.

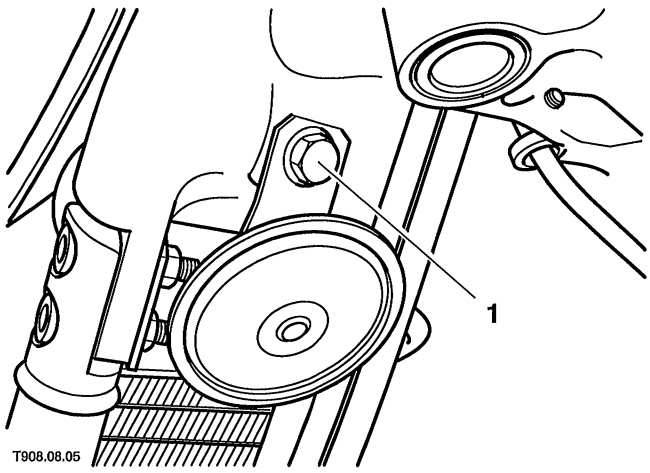
CAUTION: Do not pour engine oil on the ground, down sewers or drains, or into water courses. To prevent pollution of water courses etc., dispose of used oil sensibly. If in doubt contact your local authority

WARNING: If the engine has been running, the exhaust pipes and oil maybe hot. Take great care to avoid being scalded or burnt.

Removal

WARNING: Before staring work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

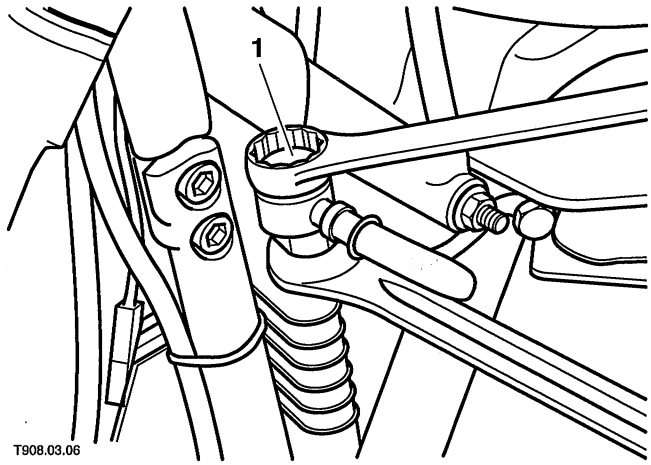
1. Remove the seat then disconnect the battery, disconnecting the negative (-) terminal first.
2. Unbolt the horn bracket from the frame and remove the horn, disconnect its wiring.



1. Horn bracket bolt

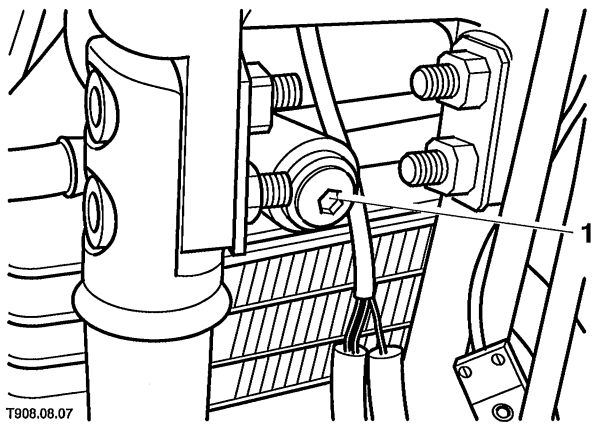
3. Position a suitable clean container beneath the oil cooler to catch any oil.
4. Wipe clean the area around the oil cooler feed and return pipe fittings.
5. Slacken and remove the banjo bolts securing the feed and return pipes to the oil cooler. Discard all the sealing washers.

CAUTION: Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is slackened.

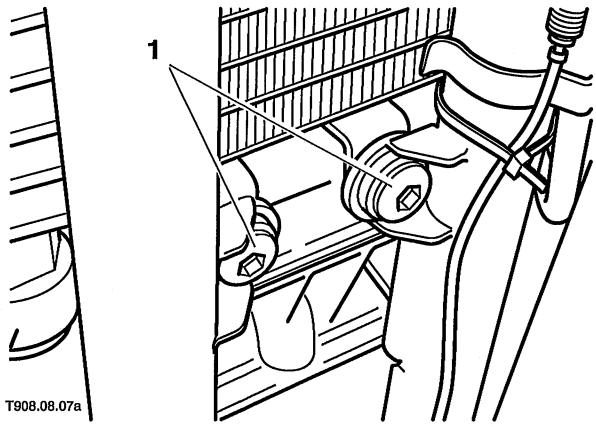


1. Banjo bolt

6. Undo the mounting screws and remove the oil cooler from the motorcycle. Take care not to lose the collars from the cooler mounting rubbers.



1. Oil cooler upper mounting screw



1. Oil cooler lower mounting screws

Inspection

1. Check the oil cooler for stone damage and inspect the oil cooler core for damage to fins or obstructions. Any damage should be repaired or the oil cooler should be renewed.

2. Check the mounting rubbers for signs of damage or deterioration. Renew the rubbers as a set if necessary.

Installation

1. Ensure the collars are fitted to the mounting rubbers then manoeuvre the oil cooler into position. Fit the mounting screws and tighten to **9 Nm**.

2. Position a **new** sealing washer on each side of the oil cooler feed and return pipe end fittings then secure the pipes to the cooler with the banjo bolts. Tighten the bolts to **45 Nm**.

CAUTION: Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is tightened.

3. Check the engine oil level and top-up if necessary.

4. Reconnect the wiring connectors to the horn then seat the horn on the frame and tighten its mounting bolt to **18 Nm**.

5. Reconnect the battery, connecting the positive (+) terminal first, then install the seat.

6. Start the engine and check for leaks.

7. Stop the engine and adjust the engine oil level as described earlier in this section.

OIL COOLER

America, and Speedmaster

WARNING: Prolonged or repeated contact with engine oil can lead to skin dryness, irritation and dermatitis. Furthermore, used engine oil contains potentially harmful contaminants which can cause cancer.

When handling used engine oil, always wear protective clothing and avoid any skin contact with the oil.

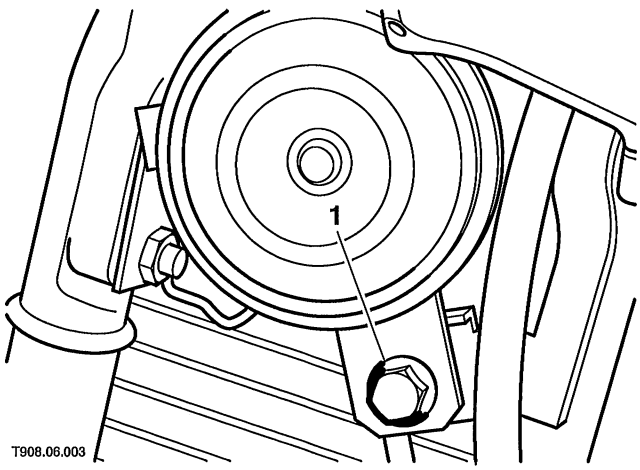
CAUTION: Do not pour engine oil on the ground, down sewers or drains, or into water courses. To prevent pollution of water courses etc., dispose of used oil sensibly. If in doubt contact your local authority

WARNING: If the engine has been running, the exhaust pipes and oil maybe hot. Take great care to avoid being scalded or burnt.

Removal

WARNING: Before staring work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

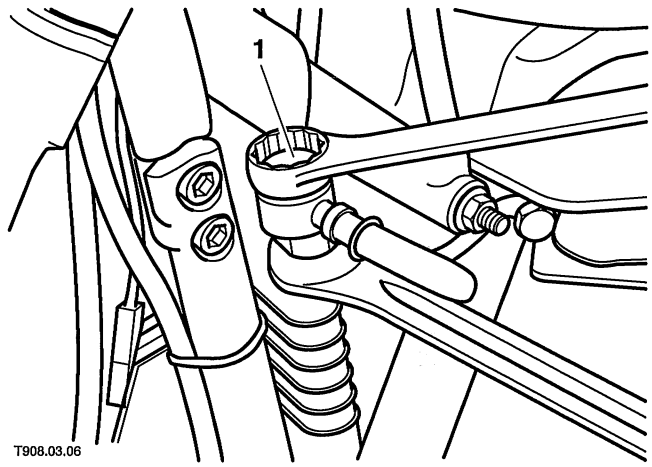
1. Disconnect the battery, negative (black) lead first.
2. Unbolt the horn bracket from the frame and remove the horn, disconnect its wiring.



1. Horn bracket bolt

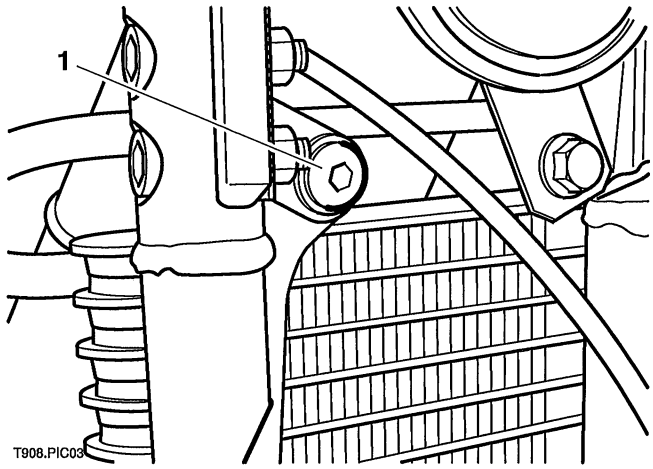
3. Position a suitable clean container beneath the oil cooler to catch any oil.
4. Wipe clean the area around the oil cooler feed and return pipe fittings.
5. Slacken and remove the banjo bolts securing the feed and return pipes to the oil cooler. Discard all the sealing washers.

CAUTION: Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is slackened.



1. Banjo bolt

6. Undo the mounting screw then raise and remove the oil cooler from the motorcycle. Take care not to lose the collars from the cooler's lower mounting rubbers.



1. Oil cooler mounting screw

Inspection

1. Check the oil cooler for stone damage and inspect the oil cooler core for damage to fins or obstructions. Any damage should be repaired or the oil cooler should be renewed.

2. Check the mounting rubbers for signs of damage or deterioration. Renew the rubbers as a set if necessary.

Installation

1. Ensure the collars are fitted to the mounting rubbers then manoeuvre the oil cooler into position. Fit the mounting screw and tighten to **9 Nm**.

2. Position a **new** sealing washer on each side of the oil cooler feed and return pipe end fittings then secure the pipes to the cooler with the banjo bolts. Tighten the bolts to **45 Nm**.

> ⚠ **CAUTION: Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is tightened.**

3. Check the engine oil level and top-up if necessary.

4. Reconnect the wiring connectors to the horn then seat the horn on the frame and tighten its mounting bolt to **18 Nm**.

5. Reconnect the battery, positive (red) lead first.

6. Start the engine and check for leaks.

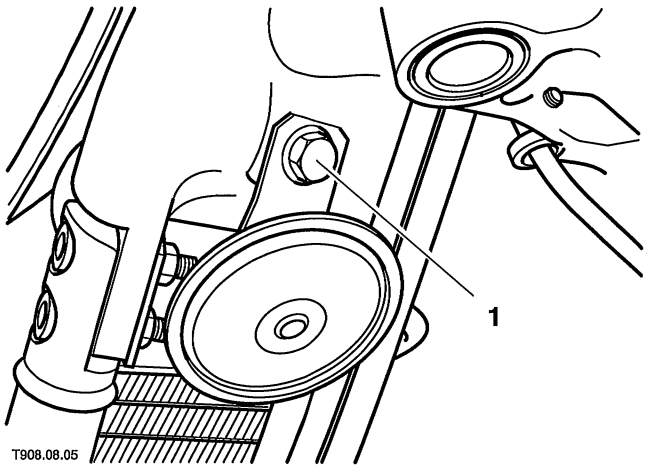
7. Stop the engine and adjust the engine oil level as described earlier in this section.

SUMP

Removal

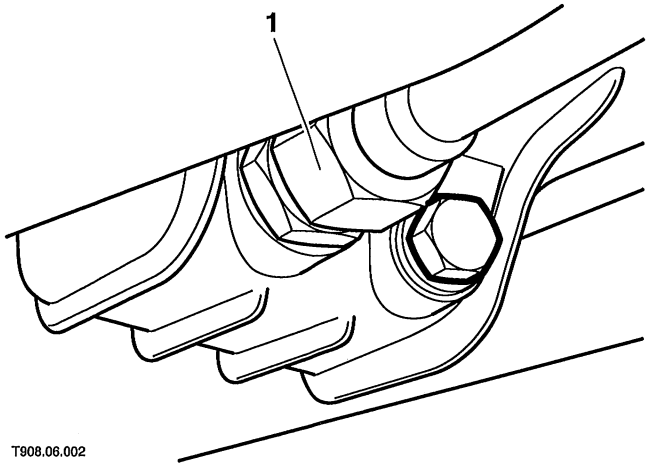
WARNING: Before staring work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Disconnect the battery, negative (black) lead first.
2. Drain the engine oil.
3. Remove the oil filter.
4. Securely support the motorcycle on a stand.
5. Unbolt the horn bracket from the frame and remove the horn, disconnect its wiring.



1. Horn bracket bolt (Bonneville)

6. Remove the oil cooler as described earlier in this section.
7. Detach the oil cooler return pipe from the sump.



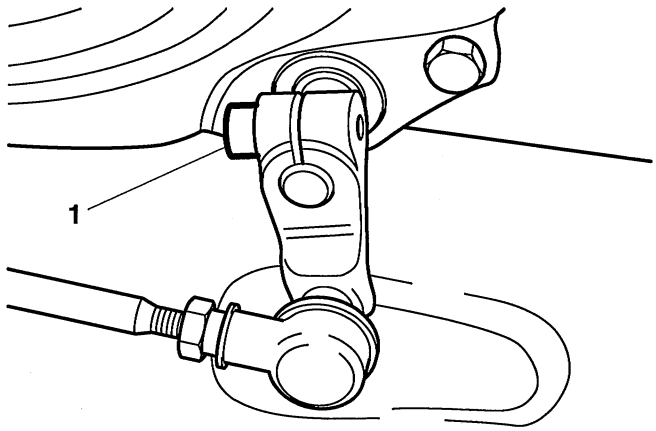
1. Oil cooler return pipe connection

CAUTION: Use an open-ended spanner to counterhold the oil cooler union with the sump as the union is slackened.

NOTE:

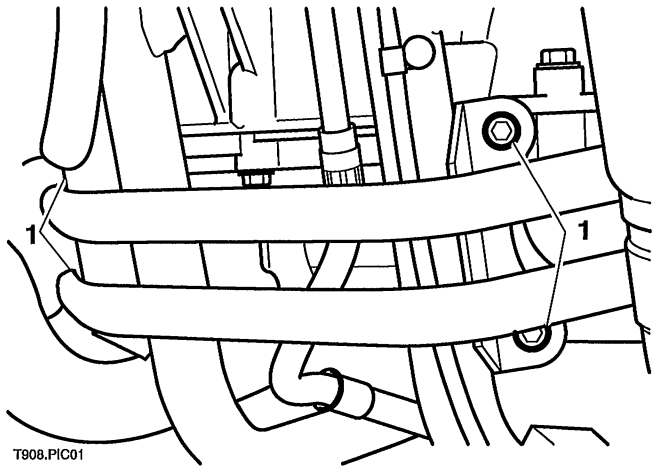
- **On early Bonneville/T100 models, the oil cooler pipe's sump union was a banjo type.**

8. On America, Speedmaster and Thruxton only, note the position of the gear change lever on its shaft then unscrew the clamp bolt and remove the lever.



1. Clamp bolt (Speedmaster)

9. On America and Speedmaster only, release the foot control mounting bar from the frame. Manouvre the bar assembly into a space above its mounting point such that it will allow the sump to be removed. Cable-tie the bar in place.



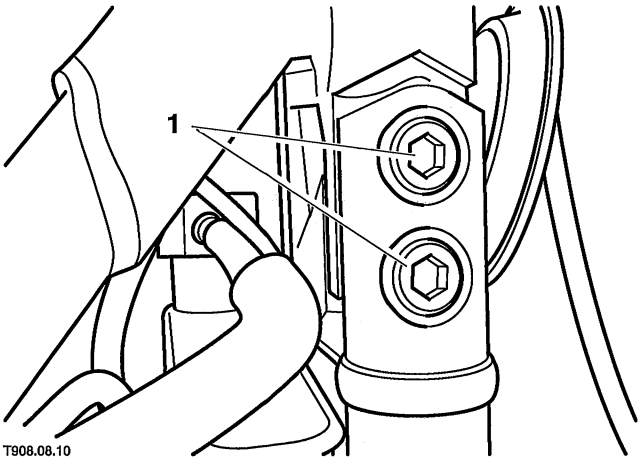
1. Mounting bar fixings

10. Release the starter motor cable from the frame right downtube, noting its correct routing.

11. Unscrew the nut and remove the front lower engine mounting bolt.

12. On Bonneville, Bonneville T100, Scrambler & Thruxton only, remove the downtube brace plate.

13. Unscrew the bolts (there are 8 in total) securing the downtubes to the frame. Recover the nut plate from each pair of bolts, noting the correct location of the oil cooler bracket.



1. Downtube to frame bolts (right-hand upper bolts shown)

14. Remove the bolts and manoeuvre the downtubes assembly away from the motorcycle.

15. Wipe clean the area around the oil cooler return pipe end fitting. Release the union and place the pipe to one side.

16. Evenly and progressively slacken and remove the retaining bolts then remove the sump.

17. Remove the sump gasket and discard it.

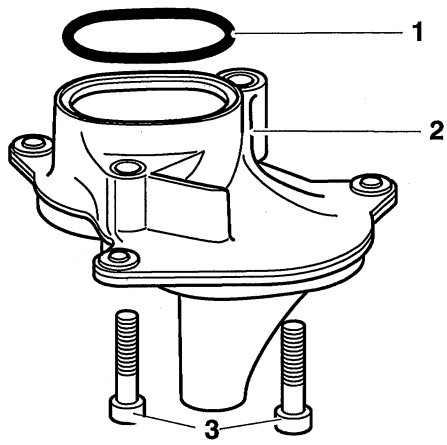
18. Check the oil pick-up strainer for blockages or restrictions. If necessary, undo the screws and remove the pick-up for cleaning. Discard the pick-up O-ring.

Installation

1. Ensure the sump and crankcase mating surfaces are clean and dry and the oil pick-up strainer is clean and unblocked.

2. Clean the threads of the oil pick-up screws and apply a drop of locking compound (Three Bond TB1360m is recommended) to each one.

3. Fit a **new** O-ring to the oil pick-up recess then fit the pick-up to the crankcase. Install the pick-up screws tightening them to **6 Nm**.



1. O-ring
2. Oil pick-up
3. Screws

4. Fit a **new** gasket then fit the sump to the crankcase. Install the retaining bolts and tighten them evenly and progressively to **12 Nm**.

5. Check the condition of the 'O' ring in the sump to oil cooler pipe adaptor then locate the oil cooler return pipe to the union and tighten to **15 Nm** while holding the adaptor.

NOTE:

- **If a new oil cooler pipe adaptor is to be fitted, always use a new washer and tighten the adapter to 45 Nm.**

- **If a banjo union is fitted, position a new sealing washer on each side of the oil cooler pipe end fitting and fit the banjo bolt. Ensure the hose is correctly positioned then tighten the banjo bolt to 45 Nm.**

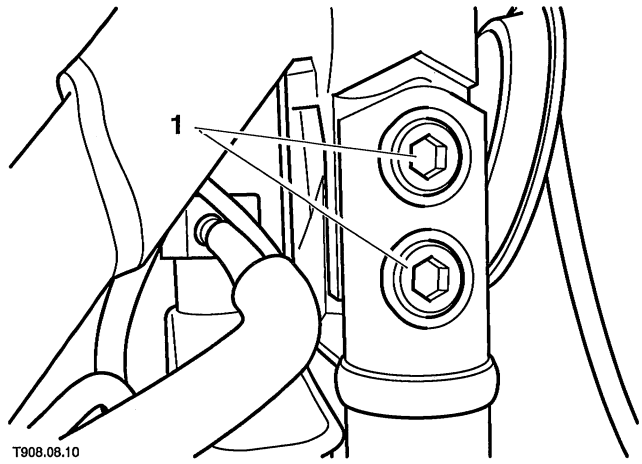
6. Refit the frame downtubes and secure with the mounting bolts. Fit the nut plates to the bolts, ensuring the oil cooler mounting bracket is correctly positioned. Hand-tighten all bolts.

7. Insert the engine front lower mounting bolt from the left hand side and hand-tighten its nut.

8. Tighten the frame downtube bolts to:

45 Nm (Bonneville, Bonneville T100 & Thruxton)

55 Nm (America, Scrambler & Speedmaster).



1. Downtube to frame bolts (right-hand upper bolts shown)

9. Tighten the engine front lower bolt to **80 Nm.**

10. On Bonneville, Bonneville T100, Scrambler & Thruxton only, refit the frame downtube brace and secure with the fixings.

11. Tighten the brace bolts to **22 Nm.**

12. Ensure the starter motor cable is correctly routed and secure it to the frame downtube.

13. Refit the oil cooler to the frame downtubes.

14. Ensure the collars are fitted to the mounting rubbers then position the cooler to the mounting points. Tighten the fixing(s) to **9 Nm.**

15. Position a **new** sealing washer on each side of the oil cooler feed pipe end fitting then secure the pipe to the cooler with the banjo bolt. Tighten the bolt to **45 Nm.**

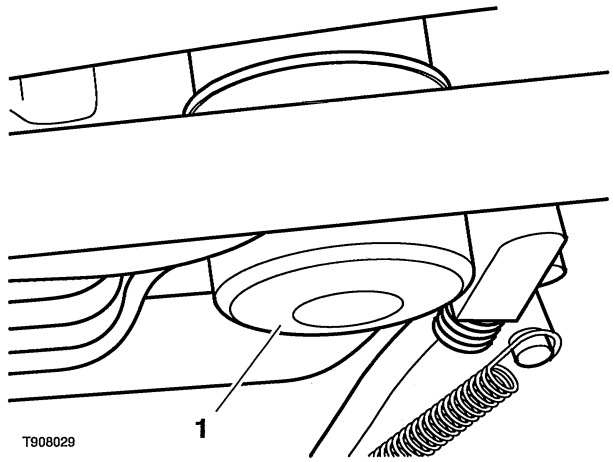
CAUTION: Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is tightened.

16. Reconnect the wiring connectors to the horn then seat the horn on the frame and tighten its mounting bolt to **18 Nm.**

17. On America and Speedmaster only, refit the foot control mounting bar, tightening the fixings to **30 Nm.**

18. On America, Speedmaster and Thruxton only, position the gearchange lever as was noted prior to removal and fit it to the shaft. Tighten the gearchange lever clamp bolt to **9 Nm.**

19. Apply a smear of clean engine oil to the seal of the new filter and fill the filter with clean engine oil.



1. Oil filter

20. Wipe clean the crankcase surface then fit the filter. Tighten the filter to **8-12 Nm** using tool T3880312.

21. Reconnect the battery positive (red) lead first.

22. Start the engine and check for leaks.

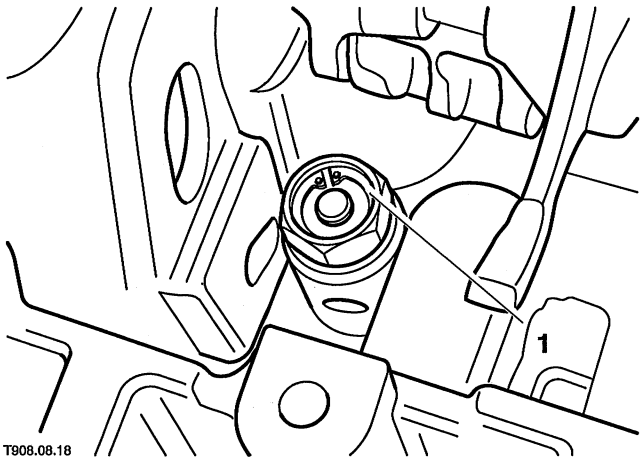
23. Stop the engine and adjust the engine oil level as described earlier in this section.

OIL PRESSURE RELIEF VALVE

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Disassemble the crankcase halves.
2. Unscrew the oil pressure relief valve from the lower crankcase half.



1. Oil pressure relief valve

Inspection

1. Check the valve plunger moves smoothly and returns freely to its stop under spring pressure. If not renew the pressure relief valve.

Installation

1. Ensure the valve threads are clean and dry.
2. Apply a drop of thread locking compound (Three Bond TB1305 is recommended) to the threads of the valve then fit it to the crankcase. Tighten the relief valve to **15 Nm**.

CAUTION: Ensure no thread locking compound enters the relief valve bore.

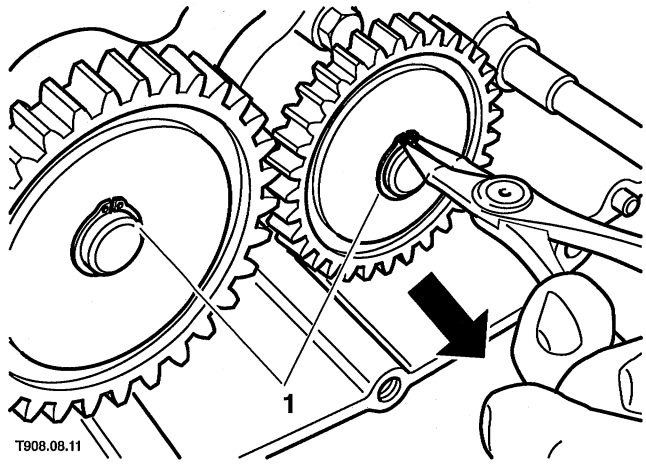
3. Assemble the crankcase halves.

OIL PUMPS

Removal

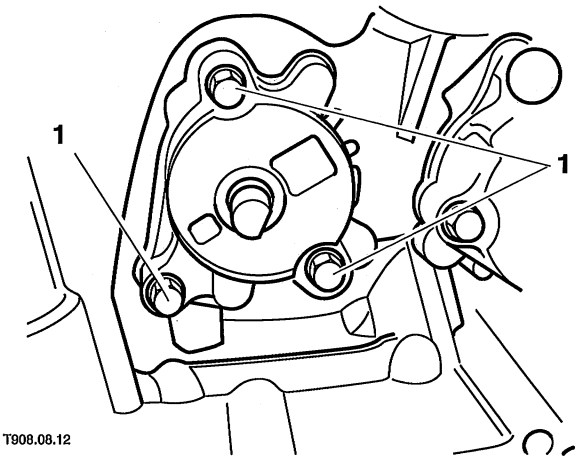
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Drain the engine oil.
2. Remove the clutch assembly.
3. Remove the circlips and slide the driven gears off of the oil pump shafts.



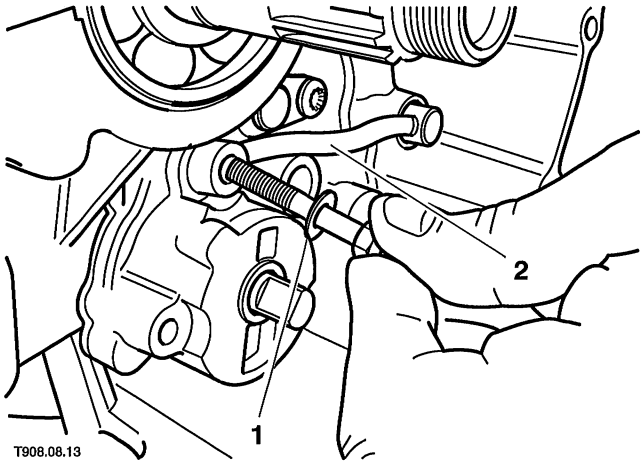
1. Oil pump driven gear circlips

4. To remove the front pump, unscrew the bolts then remove the pump from the crankcase.



1. Front oil pump bolts

5. To remove the rear pump, unscrew the bolts and remove the output shaft oil pipe and pump from the crankcase. Discard the sealing washer which is fitted to the upper (oil pipe) bolt.



1. Sealing washer

2. Oil pipe

NOTE:

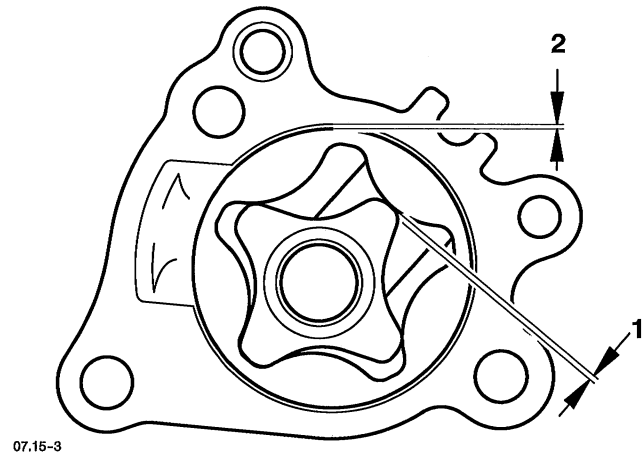
- **The front and rear oil pumps are different and are not interchangeable (see installation).**

Inspection

CAUTION: If any part of the oil pump is found to be outside the service limit, the complete pump must be replaced. Severe engine damage may result from the continued use of a faulty oil pump.

1. Inspect each pump assembly as follows.
2. Release the screw and withdraw the oil pump plate from the pump body.
3. Inspect the pump body and rotors for signs of visible wear or damage.
4. Measure the rotor tip clearance using feeler gauges.

Standard	**Less than 0.15 mm**
Service limit	**0.20 mm**



1. Rotor tip clearance

2. Pump body clearance

5. Measure the pump body clearance using feeler gauges.

Standard	**0.15 – 0.22 mm**
Service limit	**0.35 mm**

6. Measure the pump end clearance.

Standard	**0.02 – 0.07 mm**
Service limit	**0.10 mm**

7. If any of the measurements exceed the service limit, or the pump rotors or body are badly scored, renew the pump assembly.

8. If the pump is serviceable, liberally apply clean engine oil to all internal components and refit the plate to the oil pump body.

9. Inspect the driven gears for wear and/or damage and renew if necessary.

Installation

NOTE:

- **The front and rear oil pumps are different and are not interchangeable. The rear oil pump has its upper bolt location recessed to allow the output shaft oil pipe to seat on the pump.**

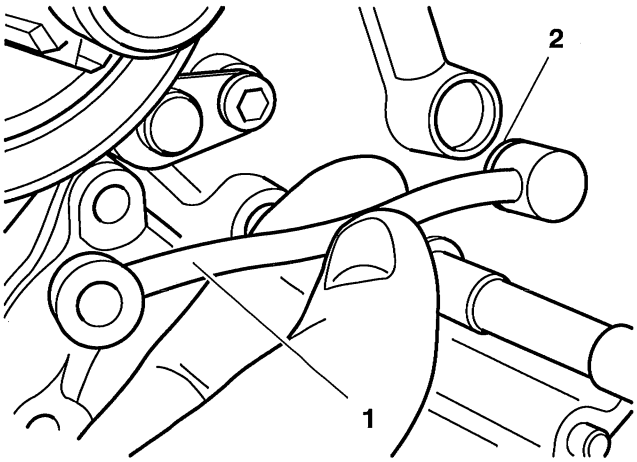
1. Fill each pump with clean engine oil and rotate the pump shaft a few times to prime the pump.

CAUTION: If an oil pump is not primed, it may fail to pick-up oil from the sump. This will cause the engine to run without oil pressure and will lead to severe engine damage.

2. Fit the front oil pump to the crankcase and install its bolts. Evenly and progressively tighten the bolts to **12 Nm**.

1. Front oil pump

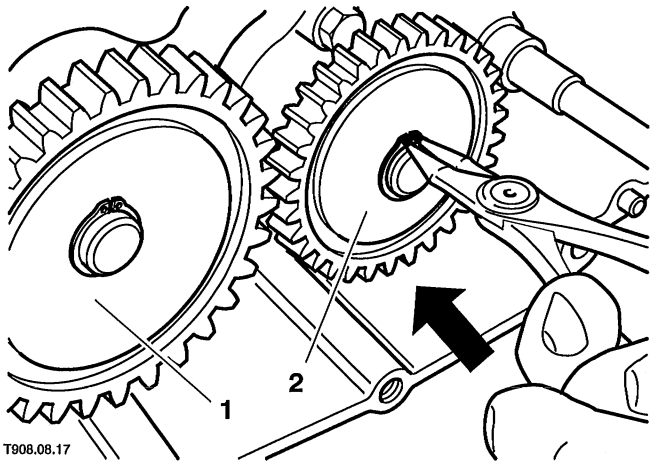
3. Fit the rear oil pump to the crankcase and install its two lower bolts. Lubricate the output shaft oil pipe O-ring with oil then fit the pipe to the crankcase. Fit the pump upper mounting bolt, complete with a **new** sealing washer, then evenly and progressively tighten all the pump bolts to **12 Nm**.



1. Oil pipe

2. O-ring

4. Fit the larger driven gear to the front pump and the smaller gear to the rear pump. Secure the gears in position with the circlips ensuring they are correctly located in the shaft grooves.



1. Larger gear

2. Smaller gear

5. Install the clutch assembly.

6. Refill the engine with oil.

FUEL SYSTEM & EXHAUST

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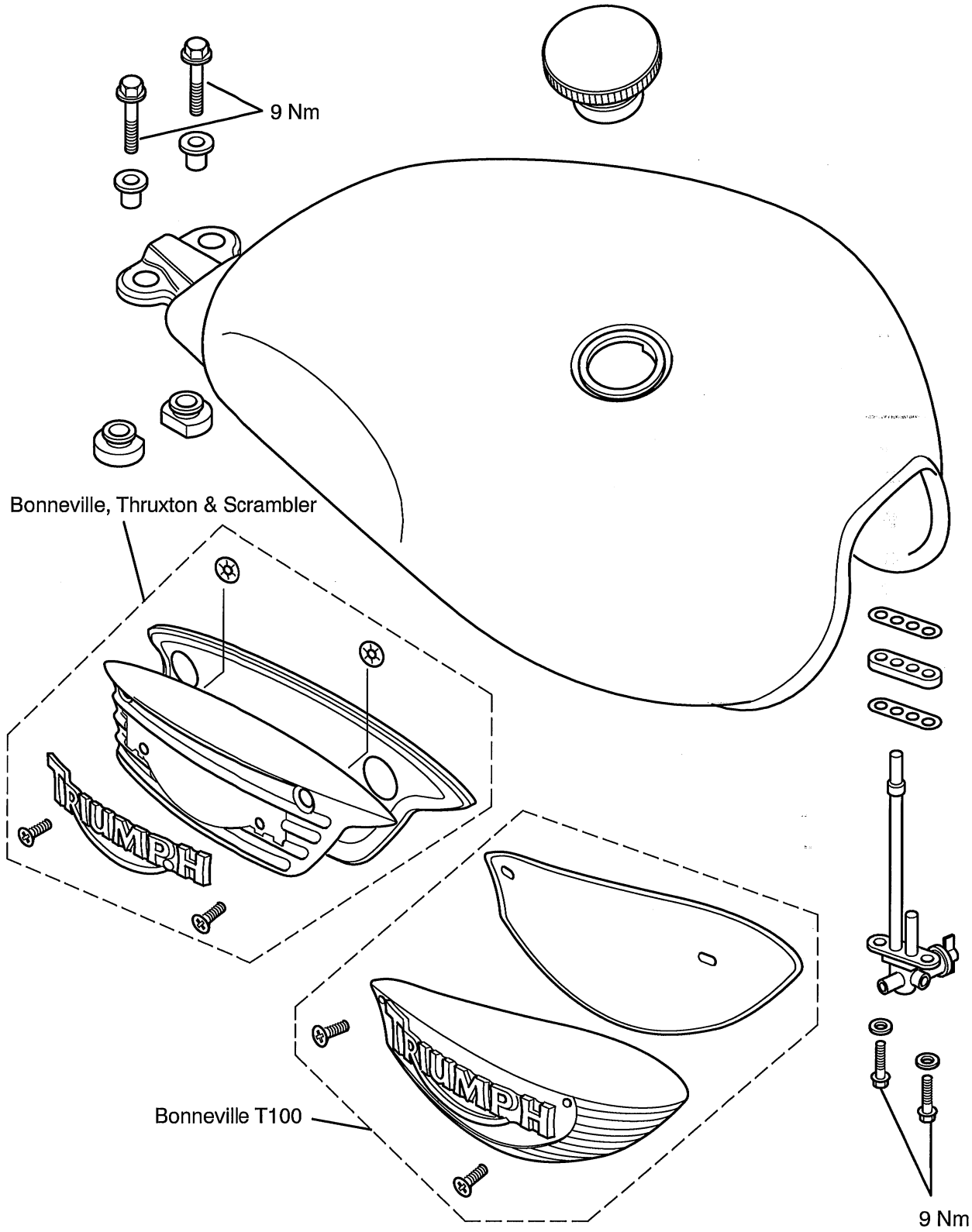
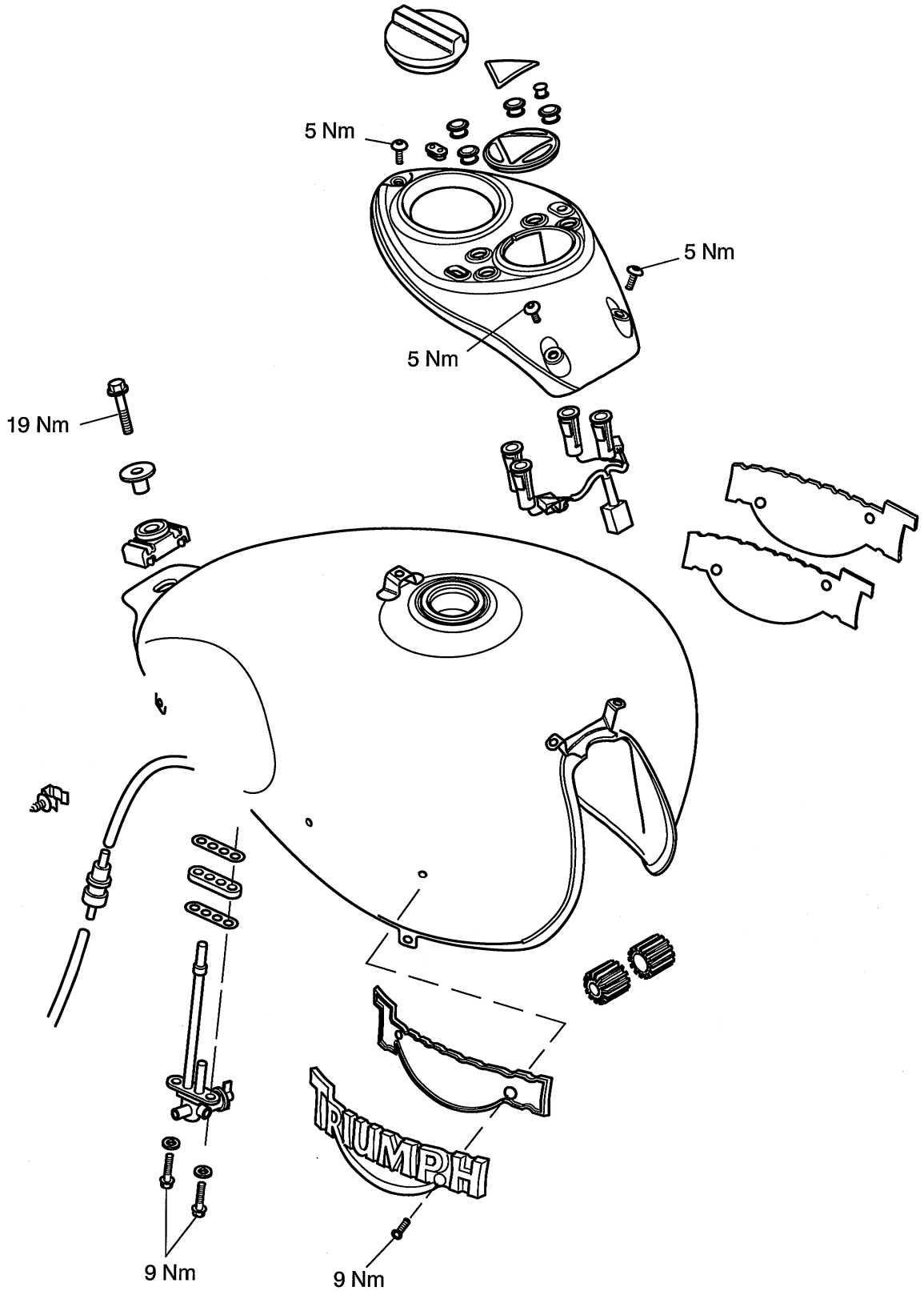
Exploded View

Fuel Tank and Fittings - Bonneville, Bonneville T100, Scrambler & Thruxton



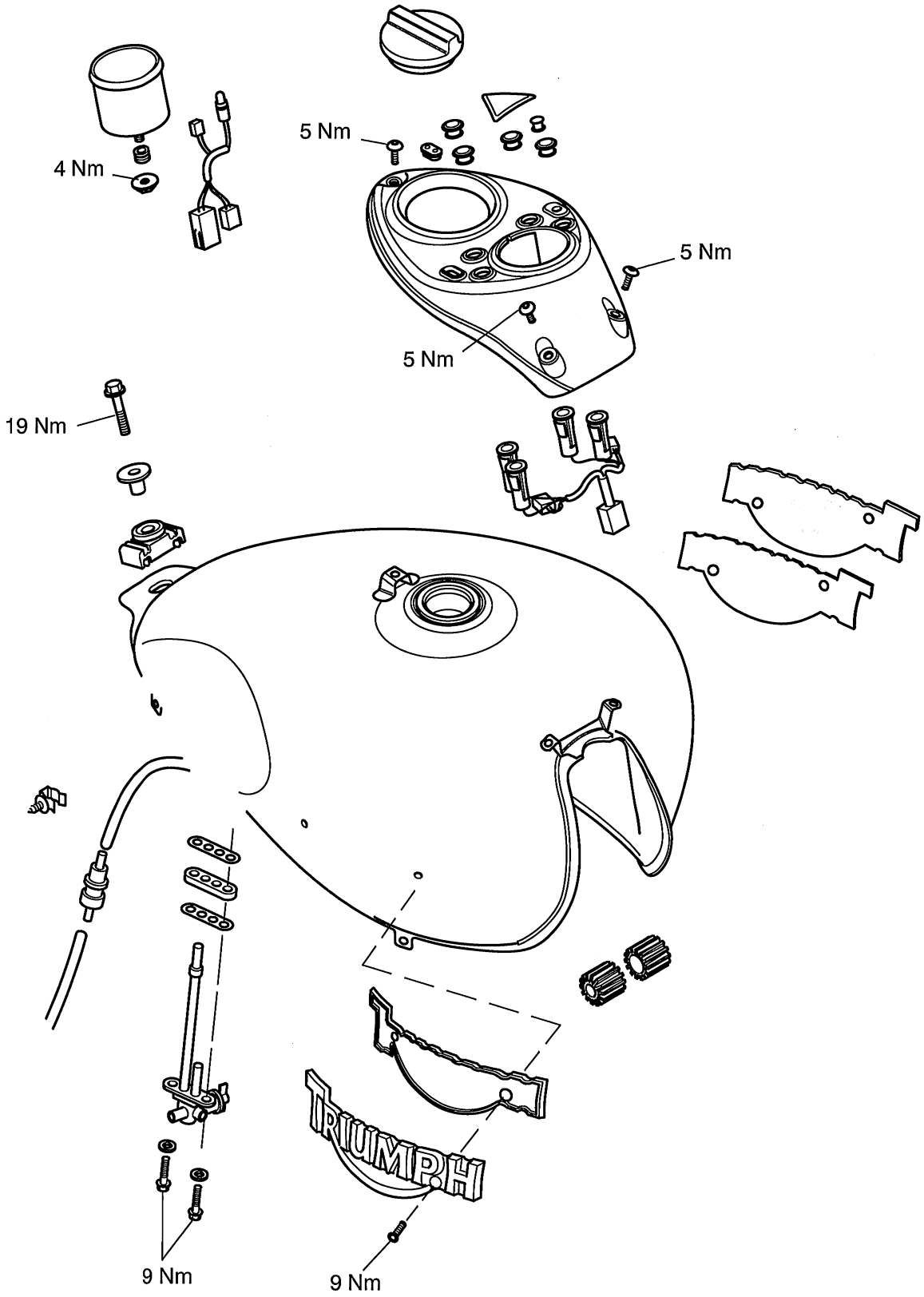
Exploded View

Fuel Tank and Fittings - America



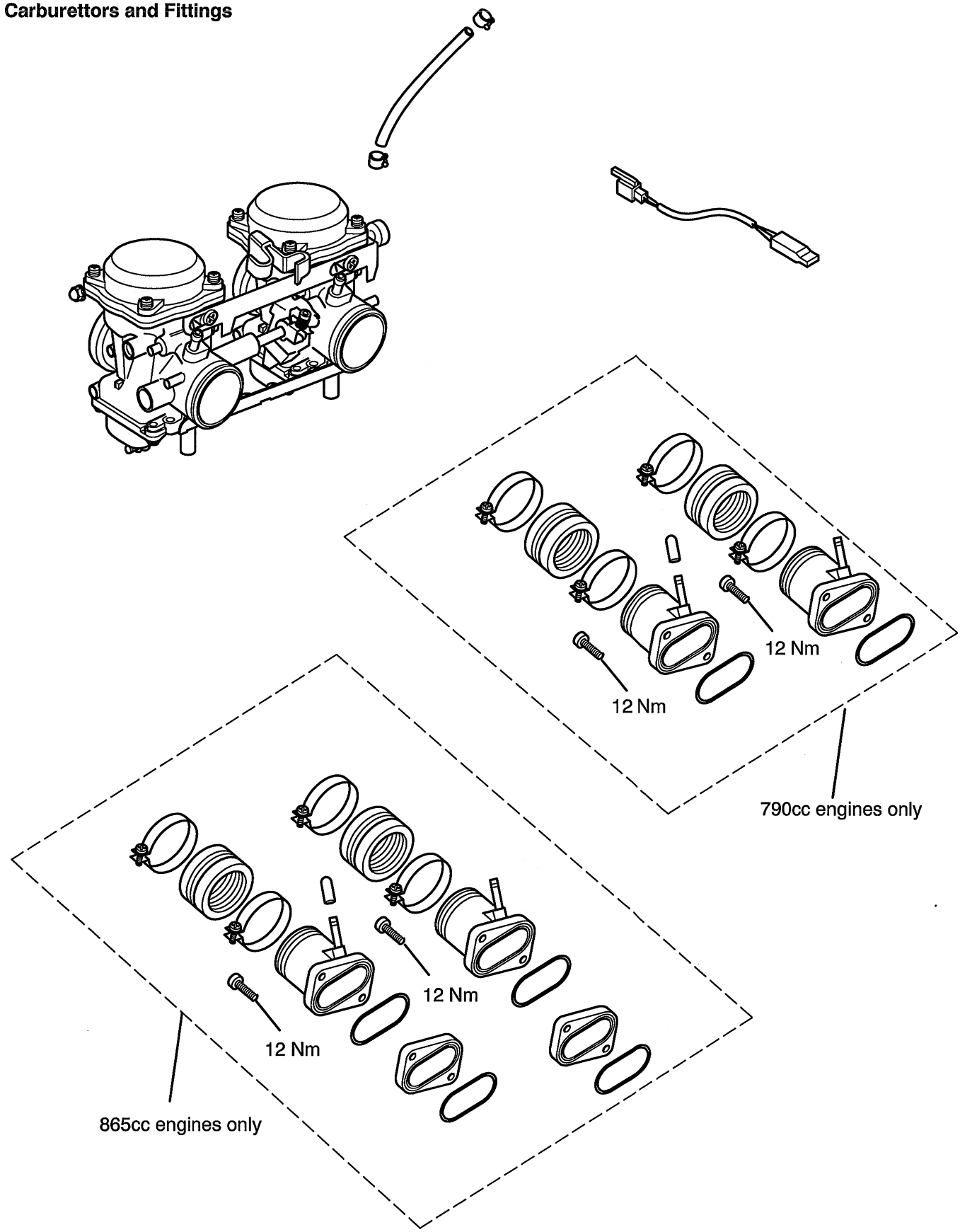
Exploded View

Fuel Tank and Fittings - Speedmaster



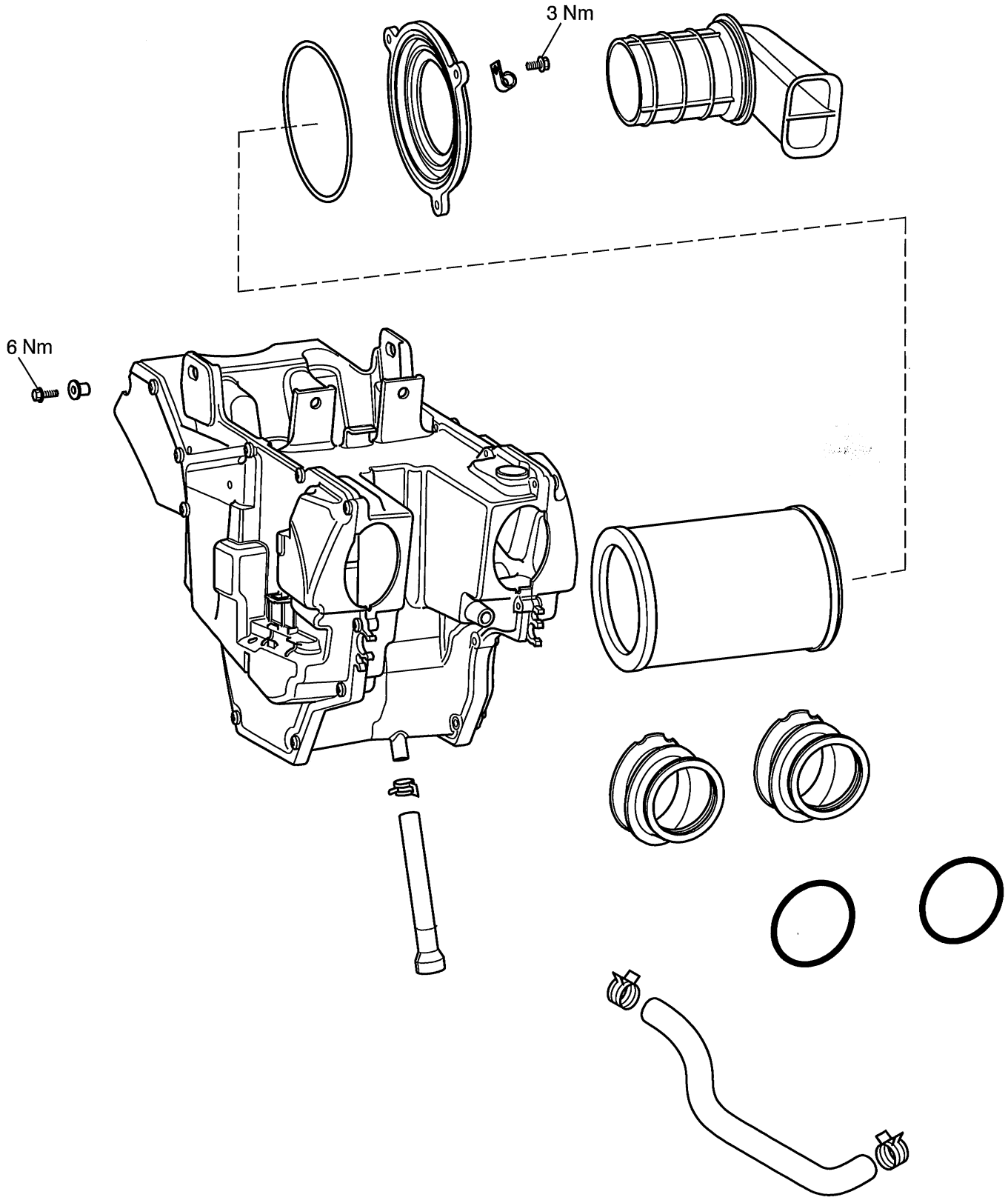
Exploded View

Carburettors and Fittings



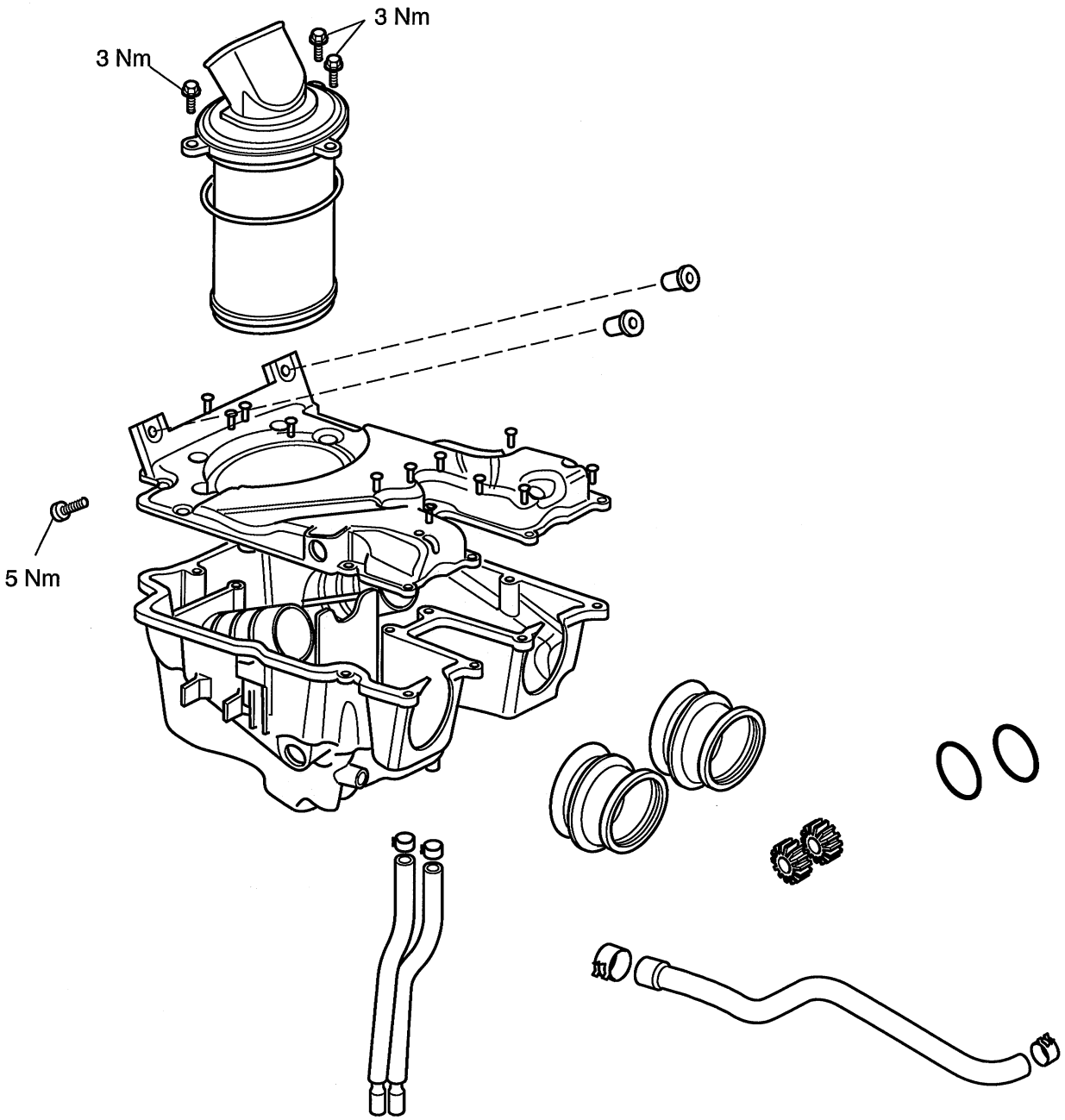
Exploded View

Bonneville, Bonneville T100, Scrambler & Thruxton Airbox



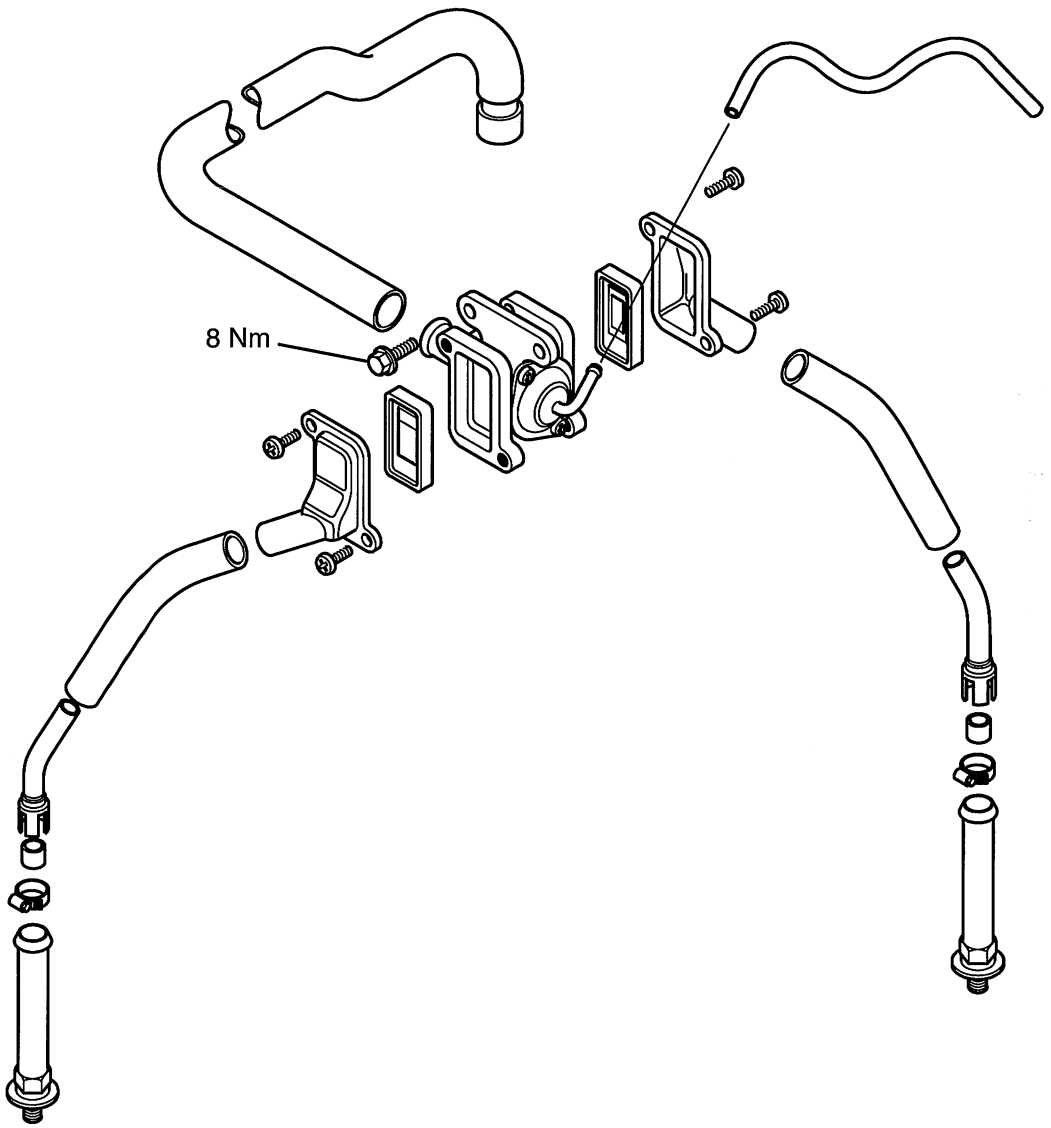
Exploded View

America & Speedmaster Airbox



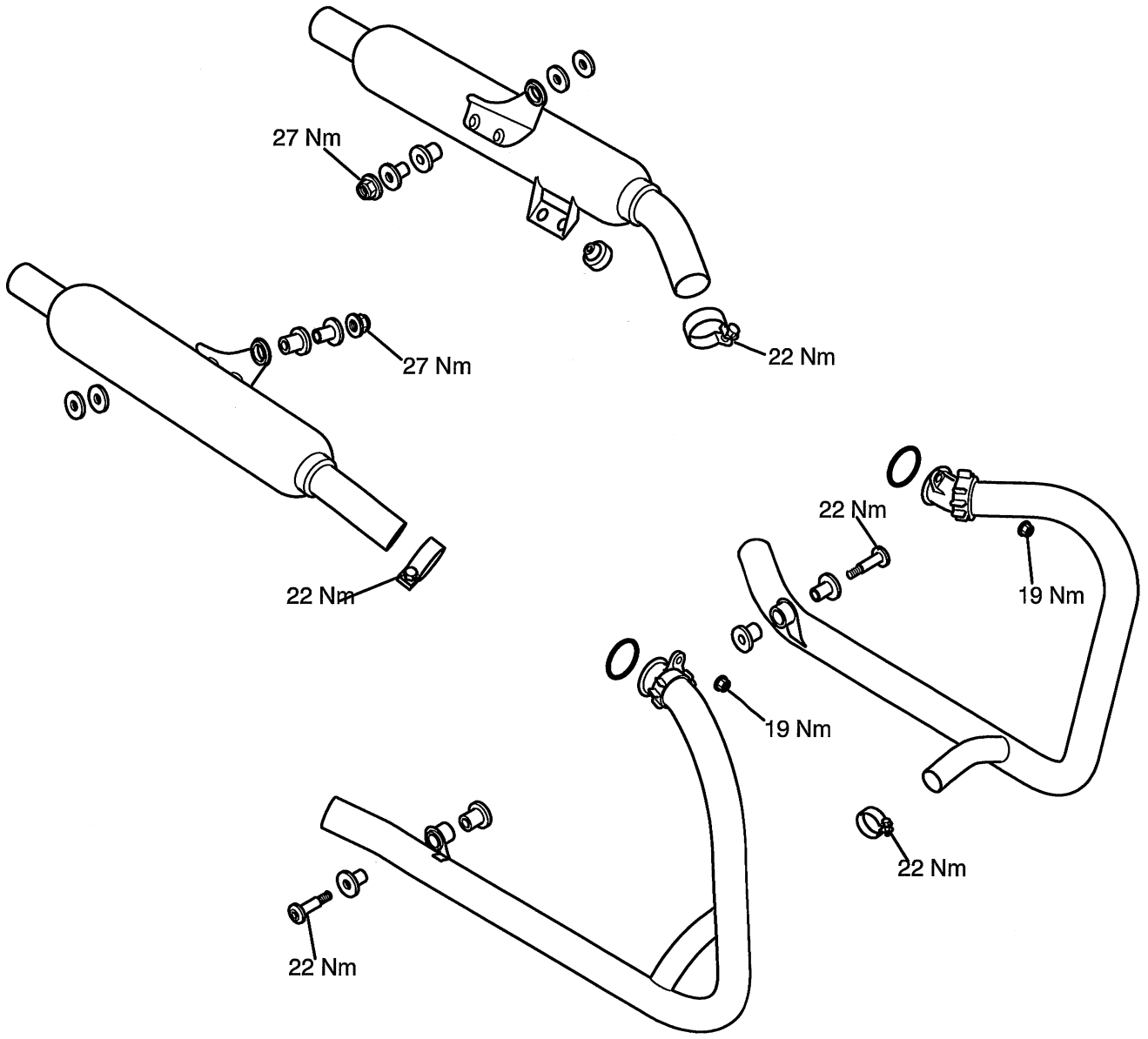
Exploded View

Secondary Air Injection System Components



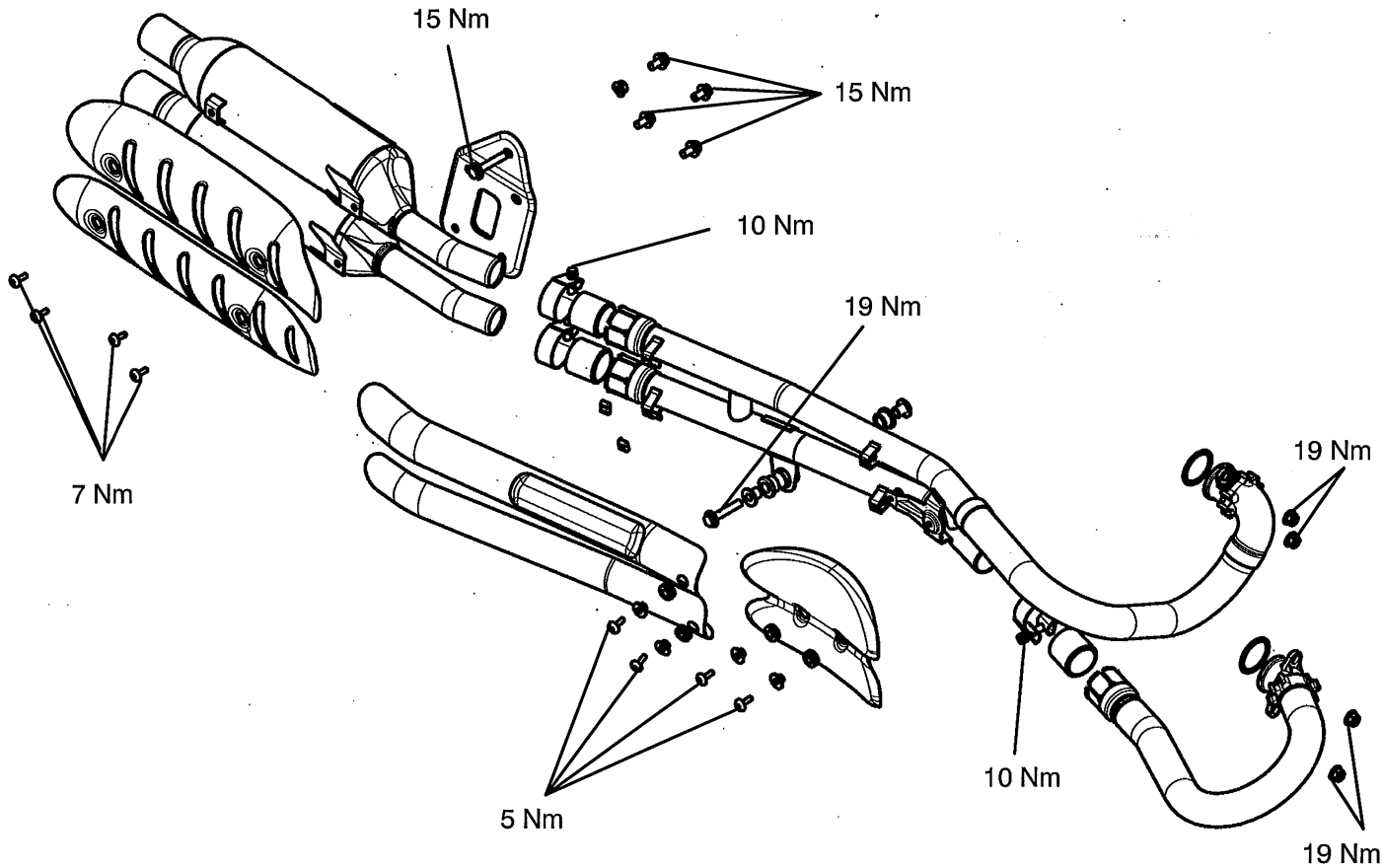
Exploded View

Exhaust System - Bonneville & Bonneville T100



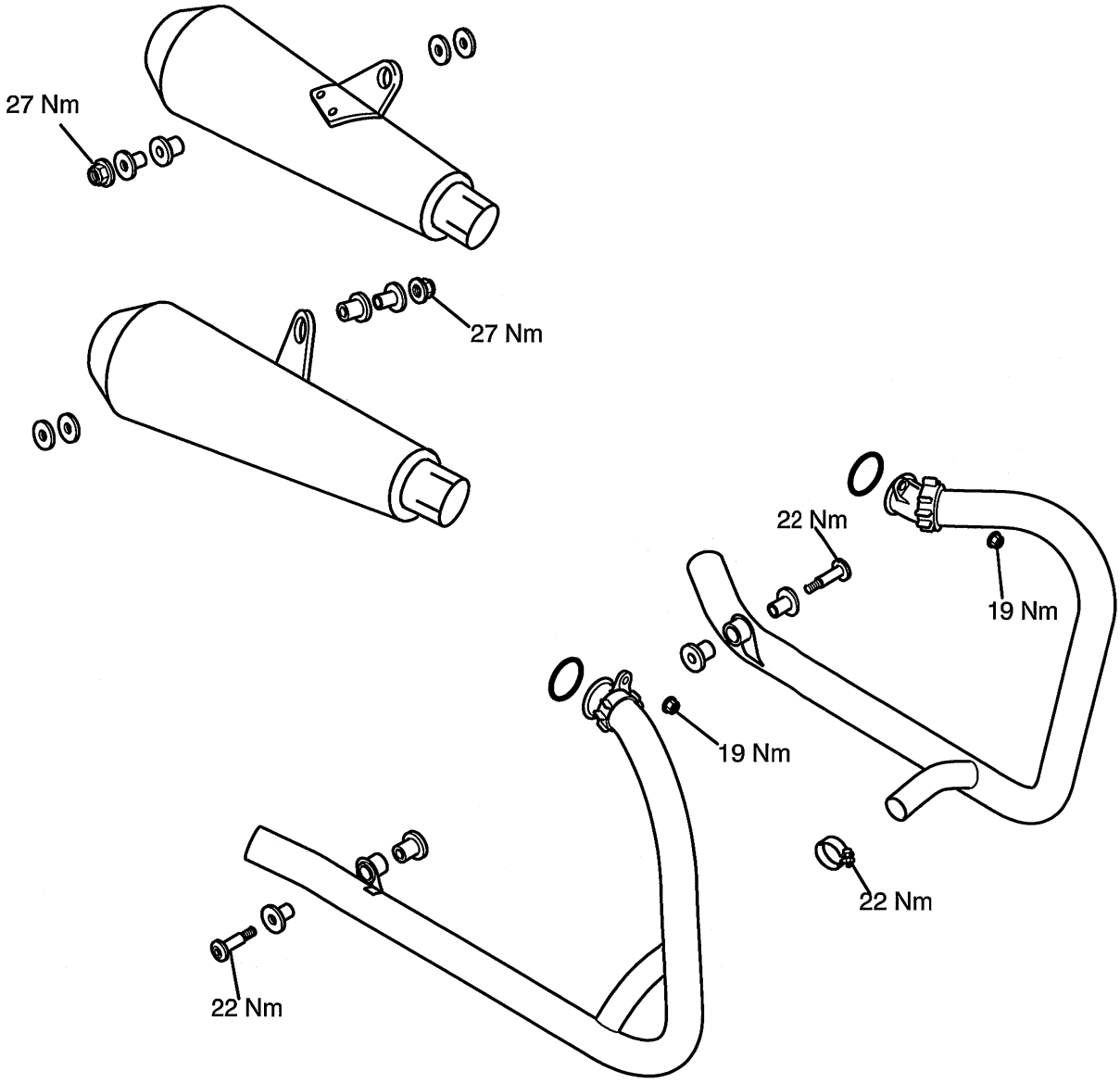
Exploded View

Exhaust System - Scrambler



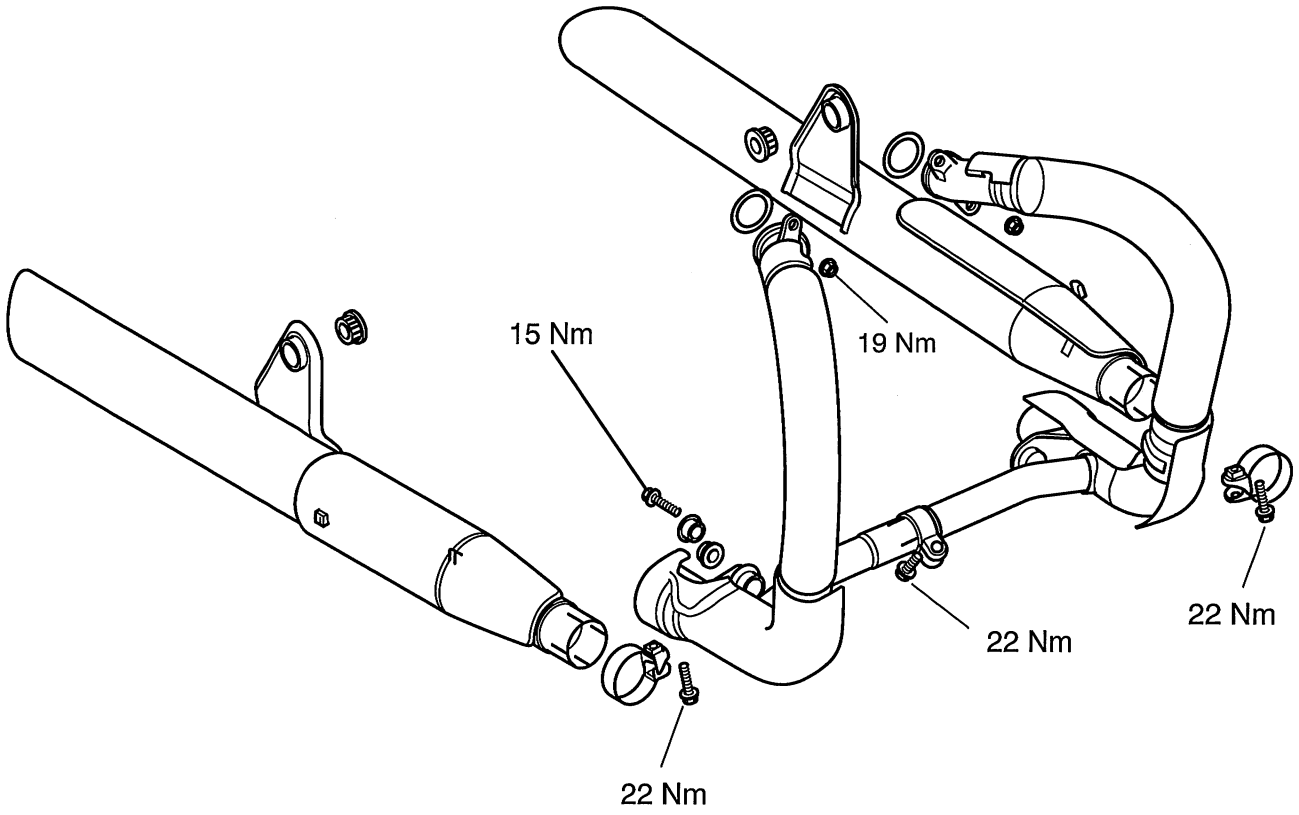
Exploded View

Exhaust System - Thruxton



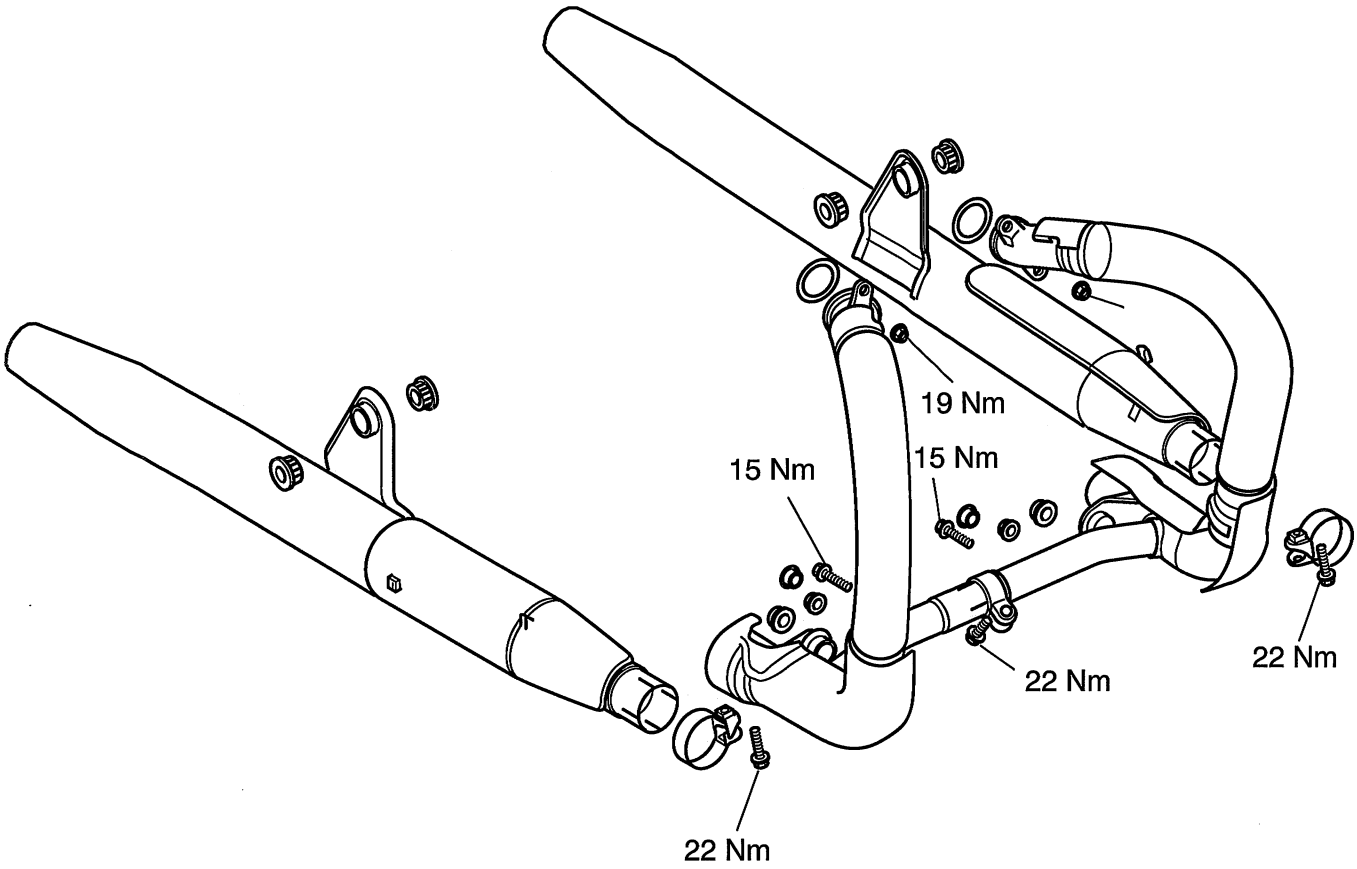
Exploded View

Exhaust System - America



Exploded View

Exhaust System - Speedmaster



FUEL REQUIREMENTS

All countries except USA

Outside America, all motorcycles are designed to be run on 95 RON unleaded fuel.

CAUTION: Most models are fitted with catalytic converters and therefore must be run on unleaded fuel. The use of leaded fuel will damage the catalytic converters

USA

In the United States of America where the octane rating of fuel is measured in a different way, the following information may be applied: Triumph motorcycles are designed to run on unleaded gasoline with a CLC or AKI octane rating (R+M)/2 of 89 or higher.

CAUTION: The use of leaded gasoline is illegal in some countries, states or territories. Check local regulations before using leaded gasoline.

Oxygenated Gasoline

To help in meeting clean air standards, some areas of the U.S. use oxygenated gasoline to help reduce harmful emissions. Triumph motorcycles will give best performance when using unleaded gasoline. However, the following should be used as a guide to the use of oxygenated fuels.

CAUTION: Because of the generally higher volatility of oxygenated fuels, starting, engine response and fuel consumption may be adversely affected by their use. Should any of these difficulties be experienced, run the motorcycle on normal unleaded gasoline.

Ethanol

Ethanol fuel is a mixture of 10% ethanol and 90% gasoline and is often described under the names 'gasohol', 'ethanol enhanced', or 'contains ethanol'. This fuel may be used in Triumph motorcycles.

Methanol

CAUTION: Fuels containing methanol should not be used in Triumph motorcycles as damage to components in the fuel system can be caused by contact with methanol.

MTBE (Methyl Tertiary Butyl Ether)

The use of gasolines containing up to 15% MTBE (Methyl Tertiary Butyl Ether) is permitted in Triumph motorcycles.

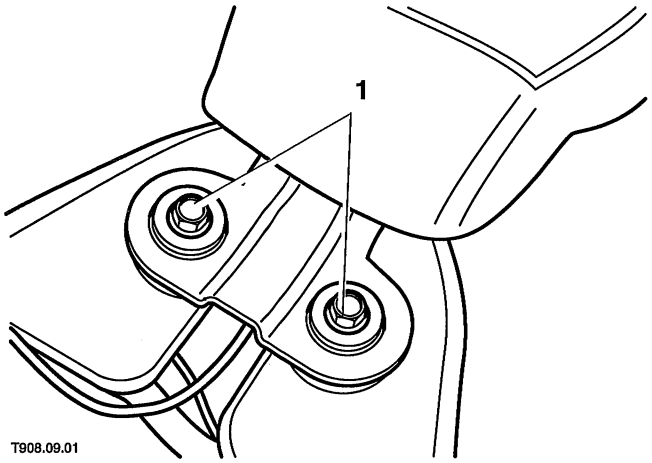
FUEL TANK - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

WARNING: Observe the warning advice given in the general information section on the safe handling of fuel and fuel containers.

A fire, causing personal injury and damage to property could result from spilled fuel or fuel not handled or stored correctly.

Removal

1. Remove the seat.
2. Disconnect the battery, disconnecting the negative (-) terminal first.
3. Ensure the fuel tap is turned OFF then disconnect the fuel hose from the tap.
4. Slacken and remove the mounting bolts from the rear of the fuel tank.



1. Fuel tank mounting bolts

5. Disconnect the breather hose from the right-hand side of the tank.

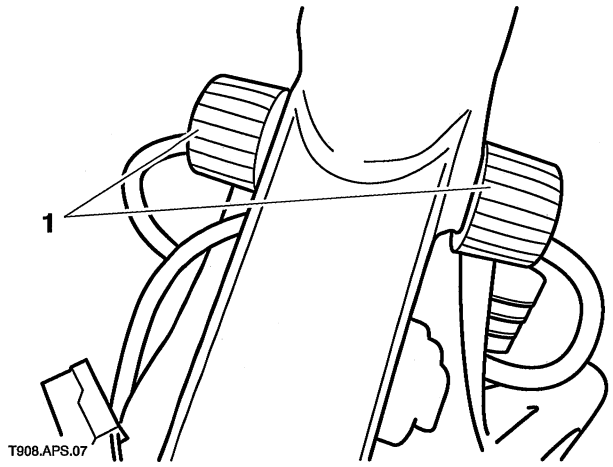
NOTE:

- **On California models, this hose is the evaporative loss system hose. Plug the hose end whilst it is disconnected.**

6. Lift the rear of the tank and slide the tank backwards to free it from the frame.
7. Take care not to lose the front mounting rubbers and the rear mounting rubbers and collars. Renew any mounting rubber which shows signs of damage.

Installation

1. Ensure the front and rear mounting rubbers are correctly fitted.



1. Fuel tank front mounting rubbers

2. Manoeuvre the tank into position, engaging it with the front mounting rubbers.
3. Securely reconnect the fuel hose and breather hose. On California models connect the evaporative loss system hose.
4. Fit the collars and bolts to the rear mounting rubbers, tightening them to **9 Nm**.
5. Reconnect the battery, connecting the positive (+) terminal first. Install the seat.
6. Turn the fuel tap ON and check for fuel leaks.

FUEL TANK - AMERICA & SPEEDMASTER

WARNING: Observe the warning advice given in the general information section on the safe handling of fuel and fuel containers.

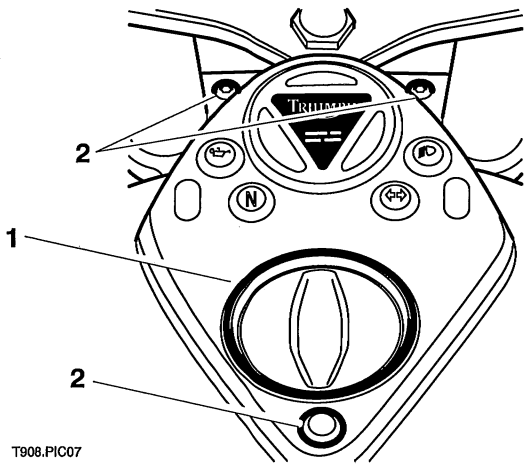
A fire, causing personal injury and damage to property could result from spilled fuel or fuel not handled or stored correctly.

Removal

1. Disconnect the battery negative (black) lead first.

2. Release the screws securing the warning light console to the tank.

3. Raise the tank and disconnect the warning light and tachometer (if fitted) sub-harness from the main wiring harness then place the warning light panel to one side.

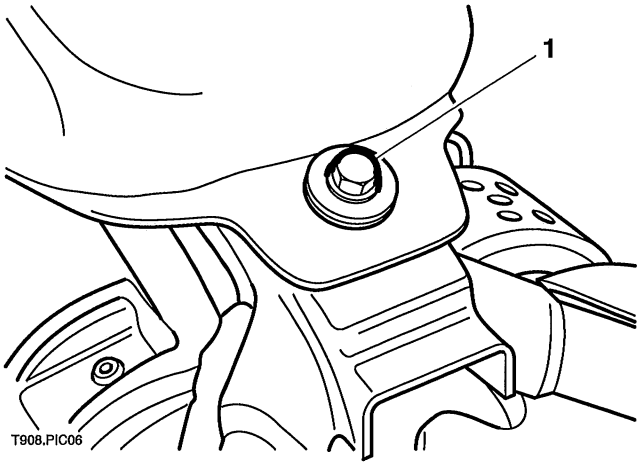


1. Warning light panel

2. Screw locations

4. Ensure the fuel tap is turned OFF then disconnect the fuel hose from the tap.

5. Slacken and remove the mounting bolt from the rear of the fuel tank.



1. Fuel tank mounting bolt

6. Disconnect the breather hose from the right-hand side of the tank.

NOTE:

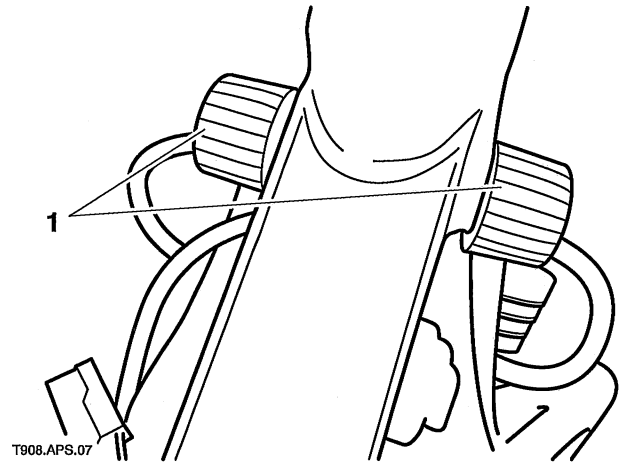
- **On California models, this hose is the evaporative loss system hose. Plug the hose end whilst it is disconnected.**

7. Lift the rear of the tank and slide the tank backwards to free it from the frame.

8. Take care not to lose the front mounting rubbers and the rear mounting rubbers and collars. Renew any mounting rubber which shows signs of damage.

Installation

1. Ensure the front and rear mounting rubbers are correctly fitted.



1. Fuel tank front mounting rubbers

2. Manoeuvre the tank into position, engaging it with the front mounting rubbers.

3. Securely reconnect the fuel hose and breather hose. On California models connect the evaporative loss system hose.

4. Fit the collar and bolt to the rear mounting rubber, tightening it to **19 Nm**.

5. Align the warning light console to the tank and reconnect the wiring.

6. Refit the screws and tighten them to **5 Nm**.

7. Reconnect the battery, positive (red) lead first.

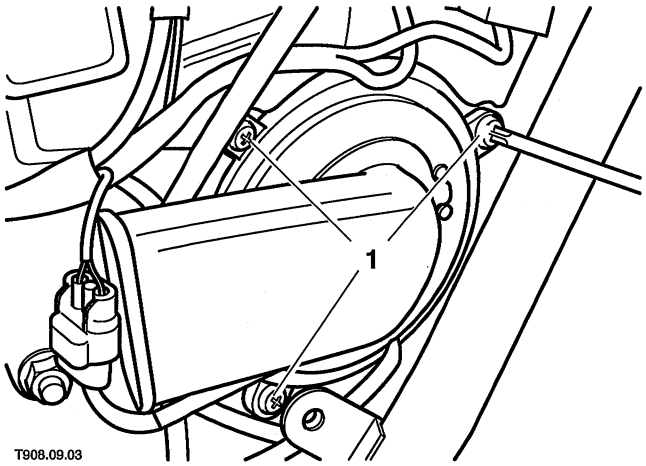
8. Turn the fuel tap ON and check for fuel leaks.

AIR FILTER ELEMENT - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

Removal

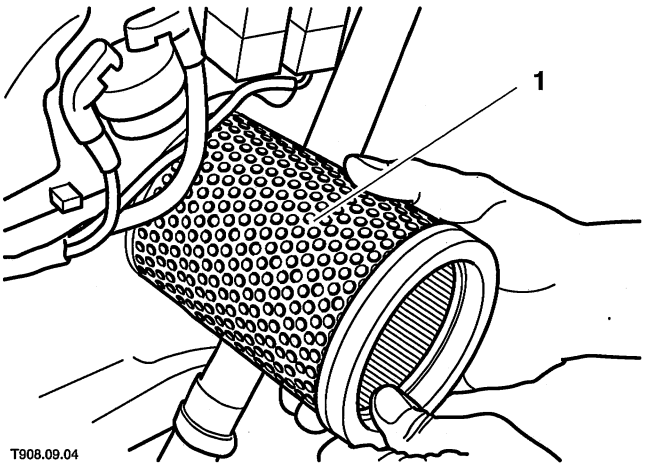
1. Remove the left-hand side cover.

2. Undo the three screws and remove the filter cover from the airbox.



1. Air filter cover screws

3. Remove the air filter element from the airbox, taking care not to damage the painted surface of the frame.



1. Air filter element

Installation

1. Insert the air filter element into the airbox, taking care not to damage the painted surface of the frame.

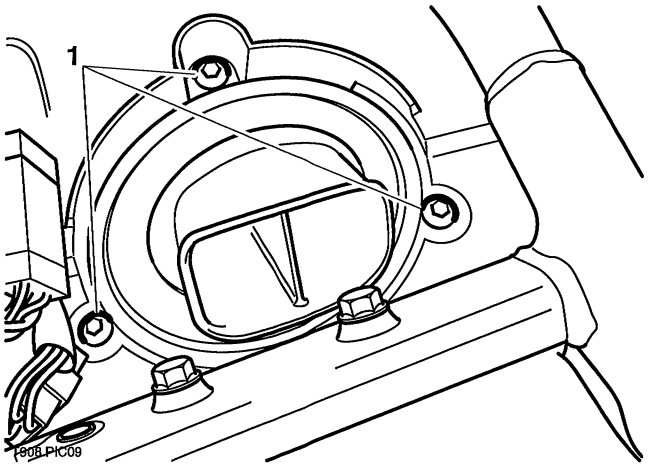
2. Refit the cover to the airbox and tighten its screws to **3 Nm**.

3. Refit the side cover.

AIR FILTER ELEMENT - AMERICA, & SPEEDMASTER

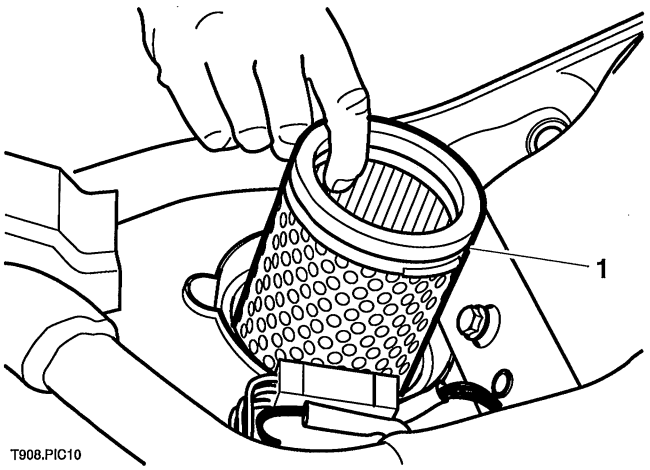
Removal

1. Remove the seats.
2. Remove the cable cover from the top of the airbox.
3. Undo the three screws and remove the filter cover from the airbox.



1. Air filter cover screws

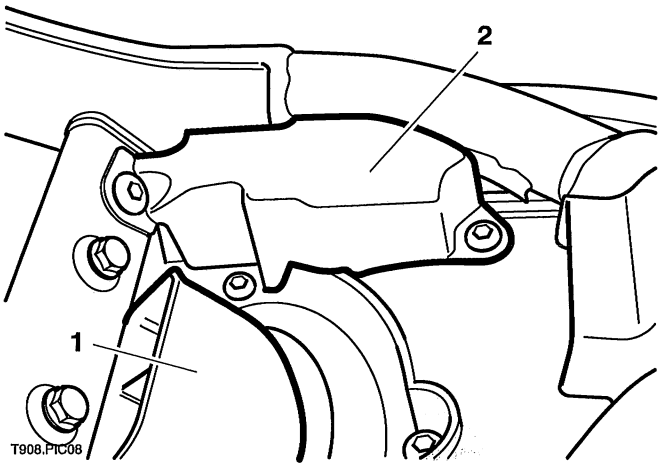
4. Remove the air filter element from the airbox.



1. Air filter element

Installation

1. Insert the air filter element into the airbox, taking care not to damage the painted surface of the frame.
2. Refit the cover to the airbox and tighten its screws to **3 Nm**.



1. Airbox

2. Cable cover

3. Refit the cable cover. Tighten the fixings to **3 Nm** while ensuring the cables are tidily placed beneath the cover
4. Refit the seats.

AIRBOX - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

Removal

1. Remove the fuel tank.
2. Remove the battery.
3. Remove both side covers and the rear mudguard (see frame & bodywork section).
4. Free all the electrical components and wiring from the airbox.
5. Release the clips securing the airbox rubbers to the carburettors.
6. Release the clip and disconnect the crankcase breather hose from the airbox.
7. Unscrew the mounting bolts and manoeuvre the airbox assembly out of position.

Installation

1. Locate the airbox to the frame and position it to the carburettors and fixing points. Ensure that the airbox rubbers correctly engage with the rear of the carburettors through 360° of BOTH rubbers. Fit the mounting bolts and tighten to **6 Nm.**
2. Ensure the rubbers are correctly seated on the carburettors and secure them in position with the clips.
3. Reconnect the breather hose to the airbox and secure it in position with the retaining clip.
4. Clip all electrical components and wiring correctly back onto the airbox.
5. Install the rear mudguard and side covers (see frame & bodywork section).
6. Fit the fuel tank and install the battery.

Draining

1. Regularly (see maintenance schedule) drain the airbox by removing the end of the drain tube fitted to the base of the box.

AIRBOX - AMERICA & SPEEDMASTER

Removal

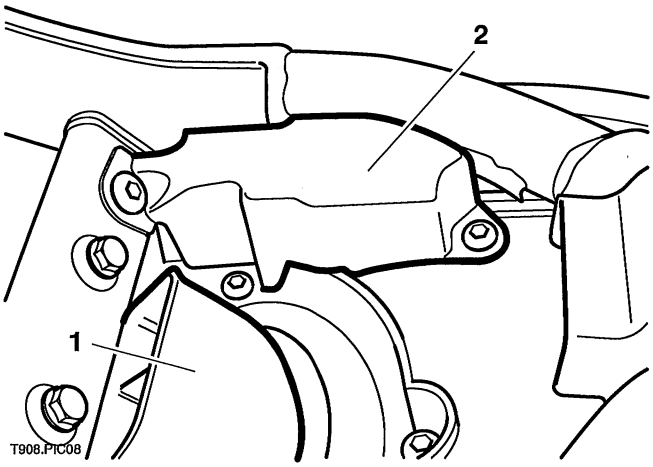
1. Raise the motorcycle and support the frame such that the rear wheel is clear of the ground.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

2. Disconnect the battery negative (black) lead first then remove the battery.

3. Remove the seat(s) as described in the body section.

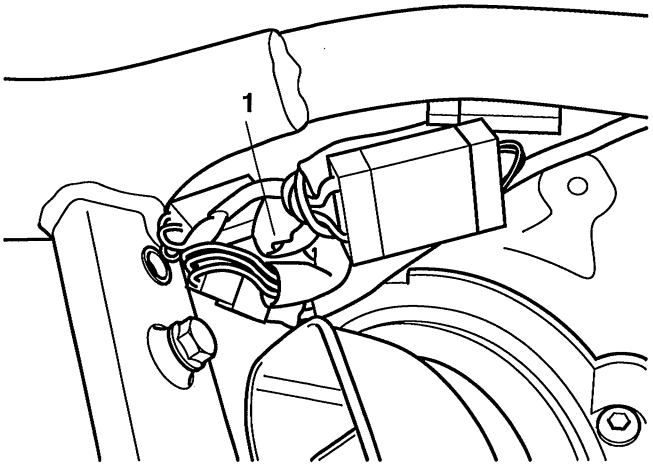
4. Remove the cable cover from the top of the airbox.



1. Airbox

2. Cable cover

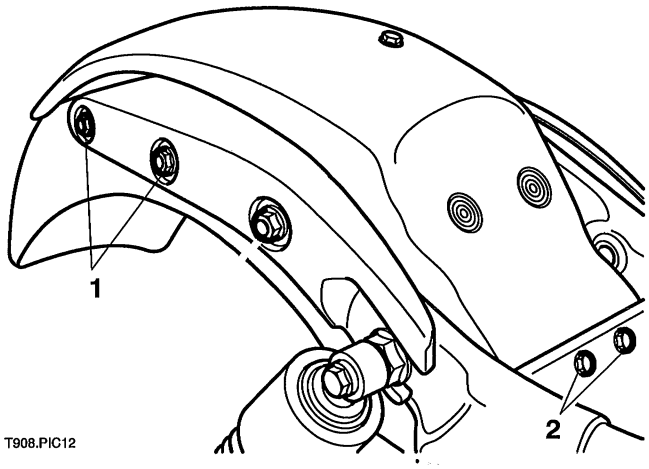
5. Disconnect the rear light wiring connector.



1. Rear light connector location

6. Remove the rear wheel as described in the wheel section.

7. Release the rear mudguard fixings shown in the diagram below then carefully remove the mudguard from the motorcycle.

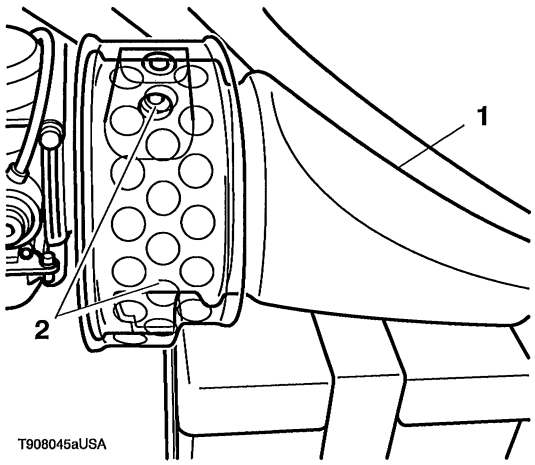


1. Rear mudguard side fixings

2. Rear mudguard front fixings

8. Remove the following:

- Airbox covers.
- Fuse/ignition switch cover.
- Battery box.
- Right hand side cover.



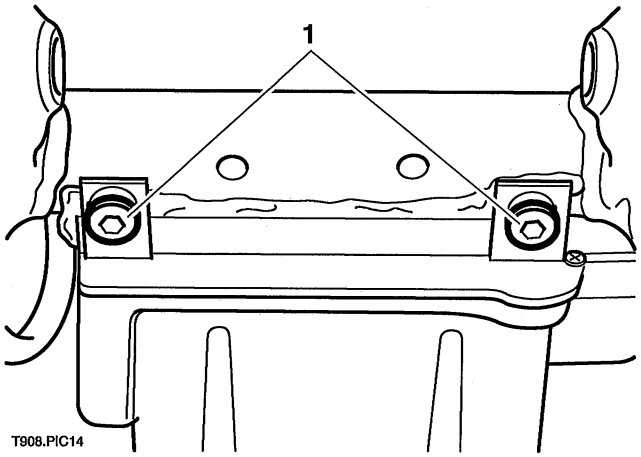
1. Airbox cover

2. Fixing

9. Support the swinging arm, then remove both rear suspension units as described in the rear suspension section.

10. Make a note of the location and routing of all airbox hoses to ensure they are refitted in the same positions.

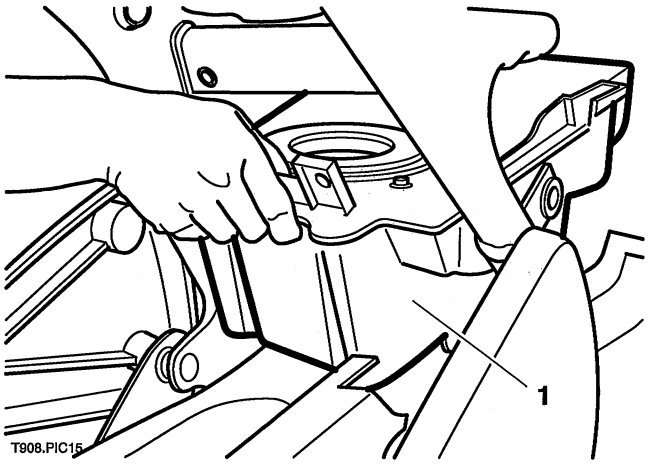
11. Release the fixings securing the airbox to the frame.



1. Airbox fixings

12. Release the clips securing the airbox to the carburettors.

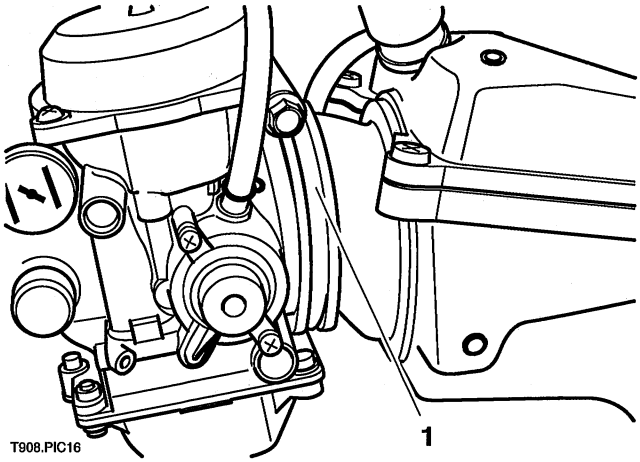
13. Remove the airbox in a rearward direction adjusting its position to enable it to clear any obstacles.



1. Airbox

Installation

1. Locate the airbox to the frame and position it to the carburettors and fixing points. Ensure that the airbox rubbers correctly engage with the rear of the carburettors through 360° of BOTH rubbers.



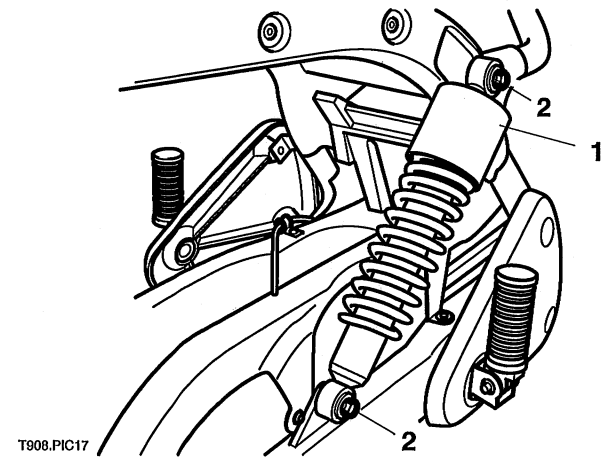
1. Carburettor rubber

2. Insert the airbox fixings, tightening to **5 Nm.**

3. Refit and correctly route all the airbox hoses as noted during strip-down.

4. Apply Threebond 1305 or equivalent to the threads of the rear suspension unit fixings.

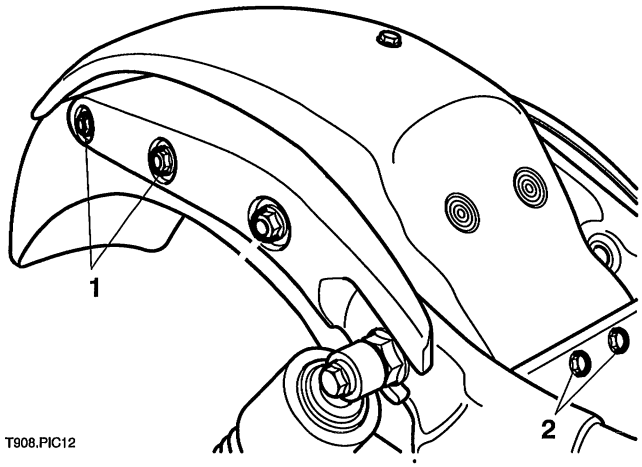
5. Support the swinging arm then refit both rear suspension units. Tighten the upper and lower fixings to **28 Nm.**



1. Rear suspension unit

2. Fixings

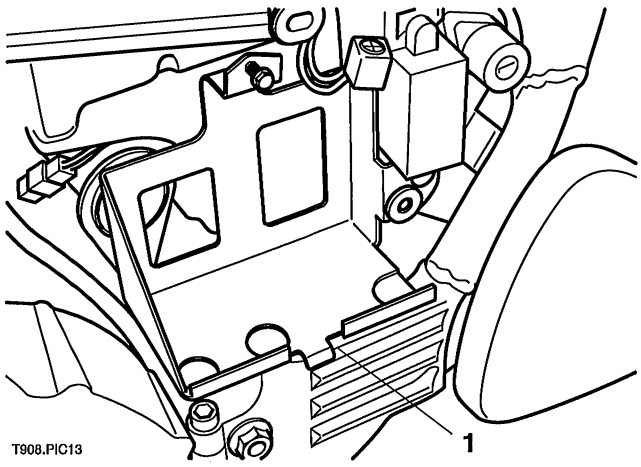
6. Carefully refit the mudguard from the motorcycle. Tighten the fixings to **26 Nm.**



1. Rear mudguard side fixings

2. Rear mudguard front fixings

7. Refit the following:
   - Right hand side cover.
   - Battery box.
   - Fuse/ignition switch cover.
   - Airbox covers.

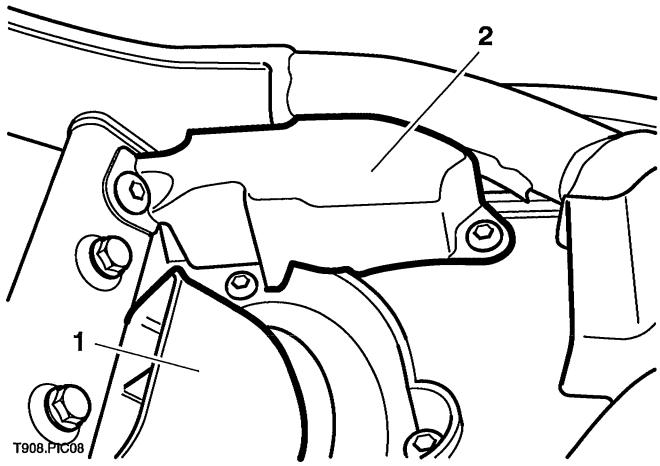


1. Battery box

8. Refit the rear wheel as described in the wheel section.

9. Reconnect the rear light.

10. Refit the airbox cable cover and tighten the fixings while ensuring the cables are tidily placed beneath the cover.



1. Airbox

2. Cable cover

11. Install and reconnect the battery positive (red) lead first.

12. Refit the seat(s).

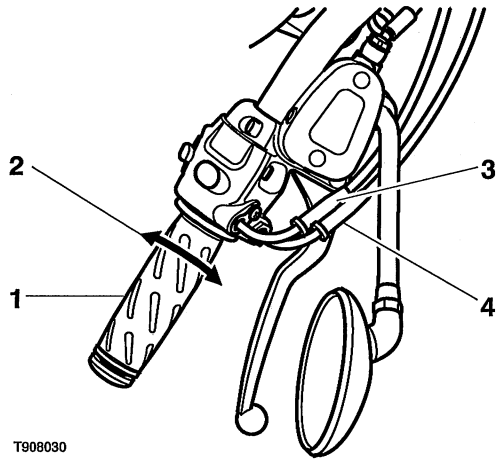
13. Switch on the ignition and test the rear light, rear indicators, number plate and brake lights for correct function. Rectify if necessary.

14. Lower the motorcycle to the ground and park on the side stand.

THROTTLE CABLES - ALL EXCEPT THRUXTON AND SCRAMBLER

Adjustment

1. Throttle cable adjustment is checked by measuring the amount of free play at the twistgrip. Adjustment is correct when 2-3 mm of free play movement is present.



1. Twistgrip

2. free play

3. Opening cable adjuster

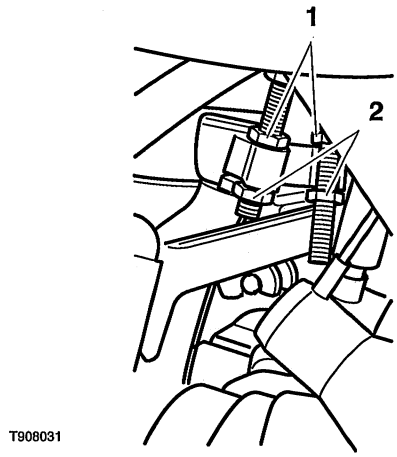
4. Closing cable adjuster

Adjustment

1. To adjust the cables, slacken the locknuts and back-off the opening and closing cable upper adjusters.

2. Set the opening cable adjuster to give 2-3 mm of free play at the twistgrip then securely tighten the locknut.

3. If there is insufficient adjustment available, back-off the upper adjuster and adjust the free play at the carburettor end of the cable. Slacken the cable locknuts and position them so all but a small amount of free play is removed from the cable. Securely tighten the locknuts then carry out final adjustment with the upper adjuster.



1. Lower adjusters

2. Locknuts

4. Once the opening cable is correctly adjusted, repeat the procedure for the closing cable.

5. With both cables correctly adjusted, move the handlebars from lock-to-lock whilst checking the throttle opens and closes smoothly and the cables do not foul the steering. Rectify any faults before riding the motorcycle.

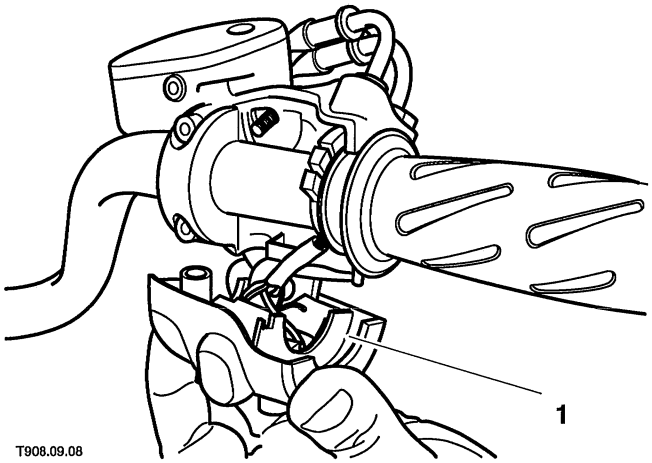
WARNING: Operation of the motorcycle with incorrectly adjusted, incorrectly routed or damaged throttle cables could interfere with the operation of the brakes, clutch or the throttle itself. Any of these conditions could result in loss of control of the motorcycle and an accident.

WARNING: Move the handlebars to left and right full lock while checking that cables and harnesses do not bind. A cable or harness which binds will restrict the steering and may cause loss of control and an accident.

Removal

1. Remove the fuel tank.

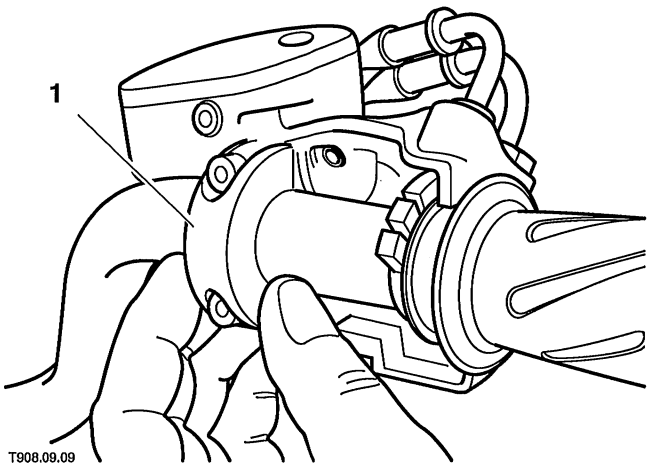
2. Undo the screws and free the right switchgear assembly from the master cylinder.



1. Right-hand switchgear assembly

3. Slacken the nut and screw securing the throttle cable end fittings to the master cylinder.

4. Unscrew the bolts and remove the mounting clamp from the master cylinder.



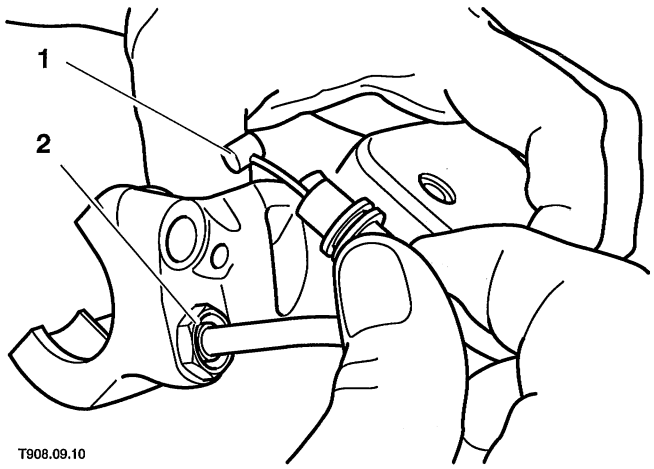
1. Master cylinder mounting clamp

5. Free the master cylinder from the handlebars and detach the cables from the twistgrip.

NOTE:

- **Ensure the master cylinder is securely supported so that no strain is placed on the hydraulic hose.**
- **If necessary, free the cables from the carburettor bracket to gain the necessary free play to allow them to be disconnected from the twistgrip.**

6. Unscrew the nut and screw and free the throttle cables from the master cylinder.



1. Opening cable

2. Closing cable

7. Slacken the locknuts then detach each cable from the carburettor throttle linkage.

NOTE:

- **Free the carburettors from the cylinder head to improve access to the throttle linkage.**

8. Note the correct routing of each cable then free them from the retaining clips and remove them from the motorcycle.

Inspection

1. Check each inner cable for free movement through the outer cable.

2. Examine each inner cable for damage, fraying etc.

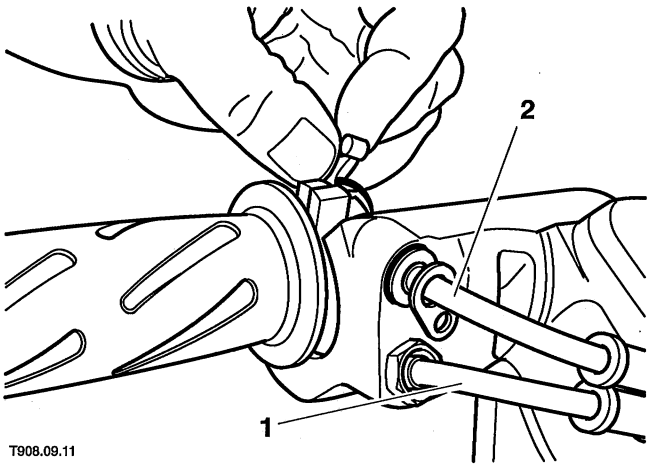
3. Examine the inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

Installation

NOTE:

- **The opening and closing cables are different and are not interchangeable. The opening cable is secured to the master cylinder by a retaining plate and screw and the closing cable by a nut.**
- **Route the throttle cables as shown in the General Information section of this manual.**

1. Fit the cables to the motorcycle. Ensure each cable is correctly routed and retained by all the necessary clips as noted during removal.
2. Connect both inner cables to the carburettor throttle linkage and seat the outer cables in the mounting bracket.
3. Locate the outer cables in the master cylinder and attach them to the twistgrip.



1. Closing cable

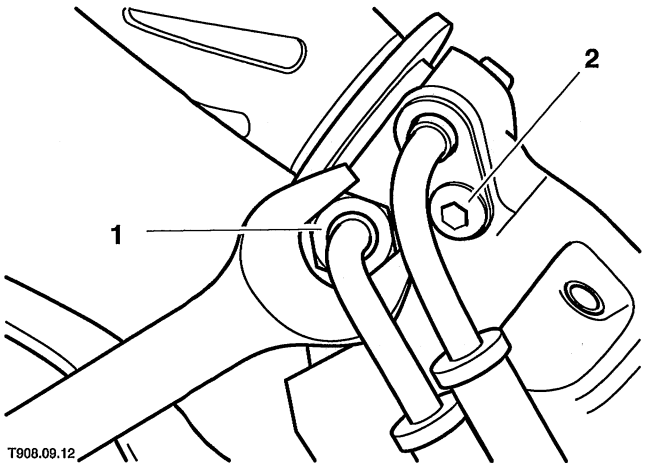
2. Opening cable

4. Locate the master cylinder on the handlebars and fit the mounting clamp. Align the clamp upper split (Bonneville & Bonneville T100) or lower split (America & Speedmaster) with the punch mark on the handlebar and tighten the upper clamp bolt to **15 Nm** then tighten the lower clamp bolt to **15 Nm.**
5. Refit the switchgear assembly, tightening its screws to **6 Nm.**

NOTE:

- **On America models, prior to assembly, tuck the wiring connector for the indicator into the recess in the front half of the switchgear.**

6. Securely tighten the nut and screw securing the throttle cables to the master cylinder.



1. Closing cable nut

2. Opening cable screw

7. Position the lower adjuster locknuts so only a small amount of free play is present in each cable then tighten them securely.
8. Operate the twistgrip several times to settle the cables in position then adjust the cable free play using the upper adjusters (see adjustment).

WARNING: Operation of the motorcycle with incorrectly adjusted, incorrectly routed or damaged throttle cables could interfere with the operation of the brakes, clutch or the throttle itself. Any of these conditions could result in loss of control of the motorcycle and an accident.

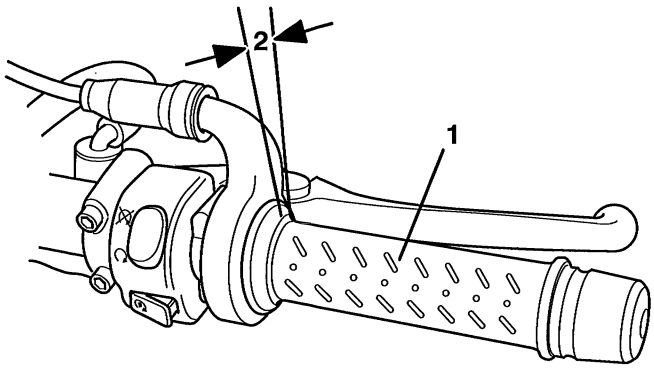
WARNING: Move the handlebars to left and right full lock while checking that cables and harnesses do not bind. A cable or harness which binds will restrict the steering and may cause loss of control and an accident.

9. Install the fuel tank.

THROTTLE CABLES - THRUXTON & SCRAMBLER

Adjustment

1. Throttle cable adjustment is checked by measuring the amount of free play at the twistgrip. Adjustment is correct when 2-3 mm of free play movement is present.

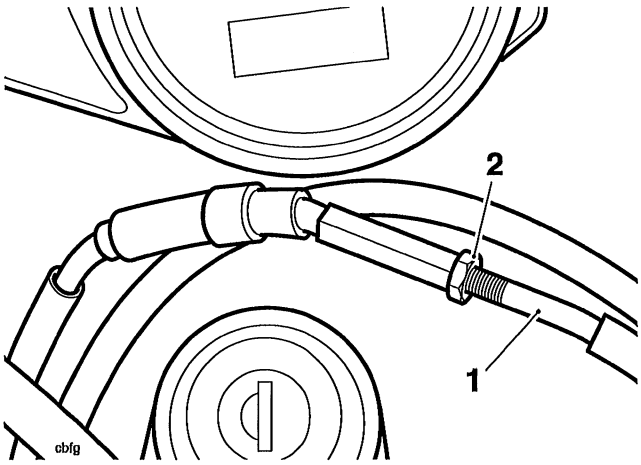


1. Twistgrip (Thruxton shown)

2. free play

2. Slide the cover off the opening cable adjuster at the twist grip end.

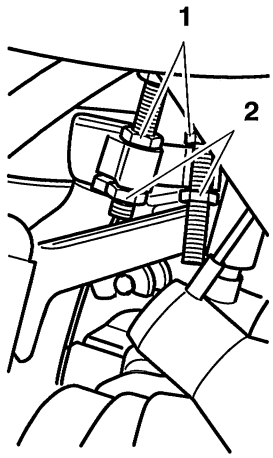
3. Rotate the 'opening' cable adjuster such that it has an equal amount of adjustment in each direction.



1. Opening cable

2. Adjuster

4. Slacken the locknut and rotate the 'opening' cable adjuster at the carburetor end of the cable to give 2-3 mm of play at the twist grip. Tighten the locknut.



1. Lower adjusters

2. Locknuts

5. Make any minor adjustments as necessary to give 2-3 mm of play using the adjuster near the twist grip end of the cable. Tighten the locknut.

6. With the throttle fully closed, ensure that there is 2-3mm of free play in the 'closing' cable. Adjust as for the 'opening' cable if necessary.

7. With both cables correctly adjusted, move the handlebars from lock-to-lock whilst checking the throttle opens and closes smoothly and the cables do not foul the steering. Rectify any faults before riding the motorcycle.

WARNING: Operation of the motorcycle with incorrectly adjusted, incorrectly routed or damaged throttle cables could interfere with the operation of the brakes, clutch or the throttle itself. Any of these conditions could result in loss of control of the motorcycle and an accident.

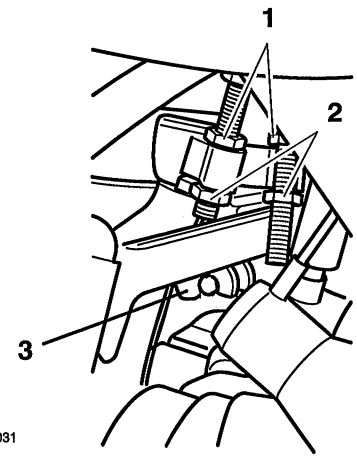
WARNING: Move the handlebars to left and right full lock while checking that cables and harnesses do not bind. A cable or harness which binds will restrict the steering and may cause loss of control and an accident.

Removal

NOTE:

- **Prior to removal, clearly identify the opening and closing cables so that they may be refitted in the correct positions.**

1. Remove the seat and disconnect the battery negative (black) lead first.
2. Remove the fuel tank and airbox as described earlier in this section.
3. Slacken the adjuster locknuts at the carburetor end such that they will allow the outer cables to be detached from the cable brackets. Detach the inner cables from the carburetor cam.

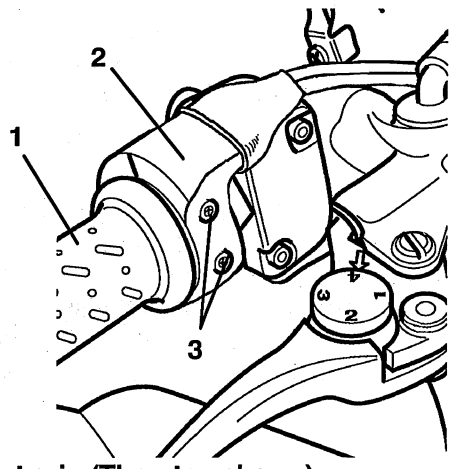


1. Lower adjusters

2. Locknuts

3. Carburetor cam

4. At the twist grip end, slide off the rubber boot and release the screws which secure the two halves of the twist grip guide to each other.

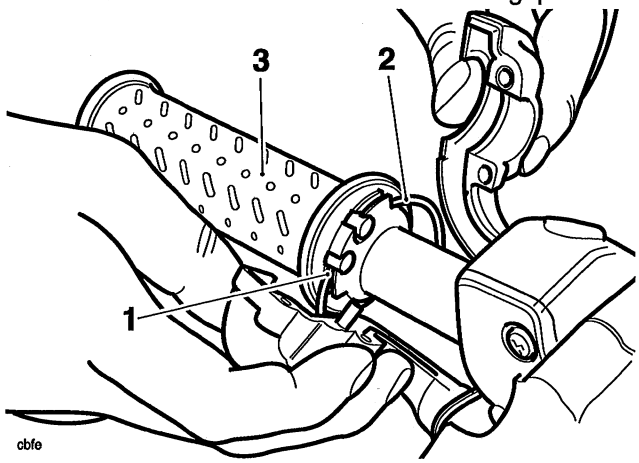


1. Twist grip (Thruxton shown)

2. Twist grip guide

3. Screws

5. Separate the two halves of the guide. Release the throttle inner cables from the twist grip.



Viewed from below the handlebar

1. Inner cable (opening cable)

2. Inner cable (closing cable)

3. Twist grip

6. Note the routing of the throttle cables and remove them from the frame.

Inspection

1. Check each inner cable for free movement through the outer cable.
2. Examine each inner cable for damage, fraying etc.
3. Examine the inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

Installation

NOTE:

- **The opening and closing cables must be correctly identified and fitted to the correct positions as noted prior to removal.**
- **Route the throttle cables as shown in the General Information section of this manual.**

1. Locate the cables to the frame following the routing noted prior to removal.
2. Engage the nipples of the inner cables to the twist grip.
3. Assemble the two halves of the cable guide ensuring that the outer cable is correctly located in the guide.
4. Refit the boot to the cable guide.
5. Attach the other end of the inner cables to the throttle cam and locate the outer cables to the cable bracket. Fit the cable locknuts.
6. Set the cable adjustment as described elsewhere in this section.

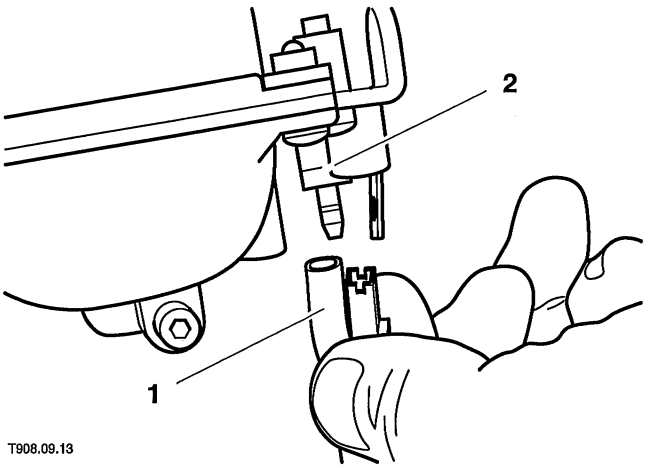
CARBURETTORS

WARNING: Observe the warning advice given in the general information section on the safe handling of fuel and fuel containers.

A fire, causing personal injury and damage to property could result from spilled fuel or fuel not handled or stored correctly.

Removal

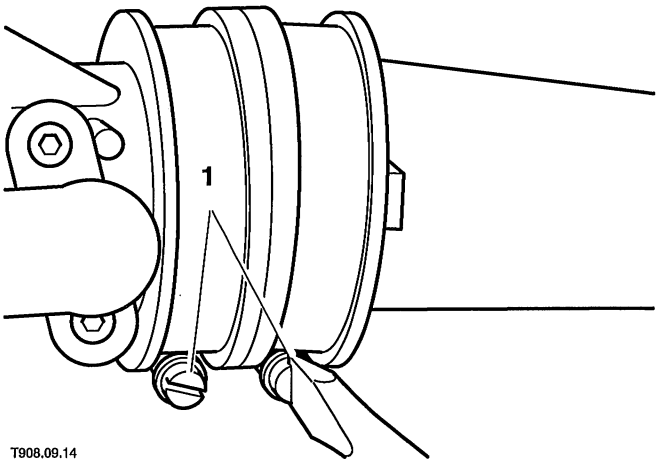
1. Remove the fuel tank.
2. Disconnect the wiring connectors from the carburettor heaters and the throttle position sensor.



T908.09.13

1. Wiring connectors
2. Carburettor heater

3. On California models, disconnect the evaporative loss system pipes from the carburettors, noting the fitted location of each. Plug the hose ends.
4. Release the retaining springs securing the airbox rubbers to the carburettors.
5. Slacken the retaining clips securing the intake rubbers to the carburettors and cylinder head adaptors.



T908.09.14

1. Retaining clip screws

6. Free the carburettors from the intake rubbers and manoeuvre them out of position.

NOTE:

- **Lubricate the intake rubbers with a silicone-based spray lubricant to ease removal.**

7. Slacken the throttle cable locknuts then detach both cables from the throttle linkage and remove the carburettors.

Installation

1. Reconnect the throttle cables to the carburettors, ensuring they are connected the right way around. Adjust the cable free play then securely tighten the locknuts.

2. Ensure the clips are all in position then lubricate the intake and airbox rubbers with a silicone-based spray lubricant.

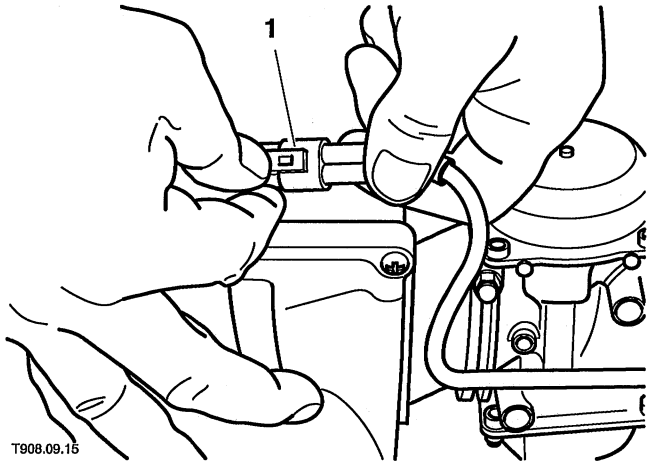
3. Manoeuvre the carburettors into position and engage them correctly with the intake and airbox rubbers.

4. Ensure the carburettors are correctly seated in the intake rubbers then securely tighten the retaining clips.

5. Ensure the airbox rubbers are correctly seated on the carburettors then secure them in position with the spring clips.

6. On California models correctly reconnect the evaporative loss system hoses.

7. Reconnect the wiring connectors to the carburettor heaters and throttle position sensor.



1. Throttle position sensor wiring connector

8. Check the throttle cables are correctly adjusted then install the fuel tank.

CARBURETTOR OVERHAUL

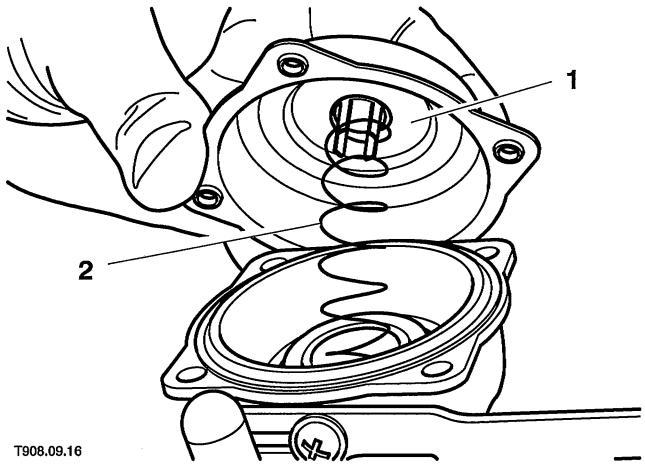
Disassembly

NOTE:

- **The carburettors can be overhauled without being separated.**
- **Overhaul each carburettor individually to avoid interchanging parts.**

1. Remove the carburettors. Each carburettor can then be overhauled as follows.

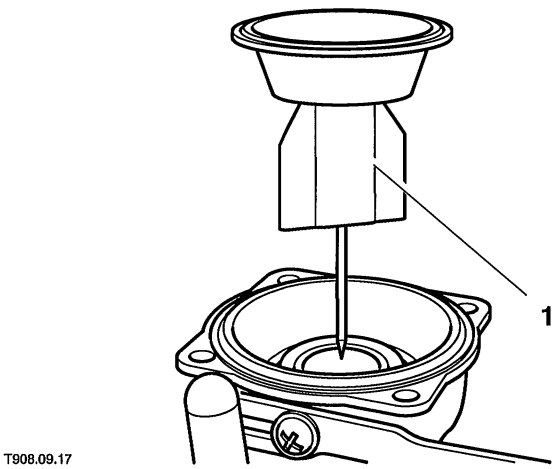
2. Undo the screws and remove the vacuum chamber cover and spring.



1. Vacuum chamber cover

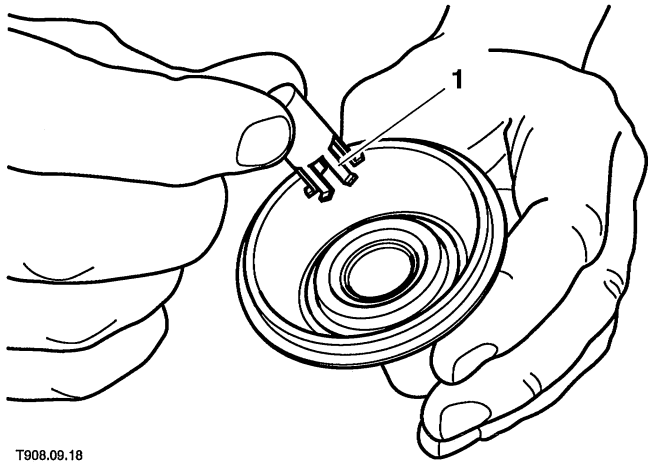
2. Spring

3. Free the diaphragm from the top of the carburettor and withdraw the piston assembly.



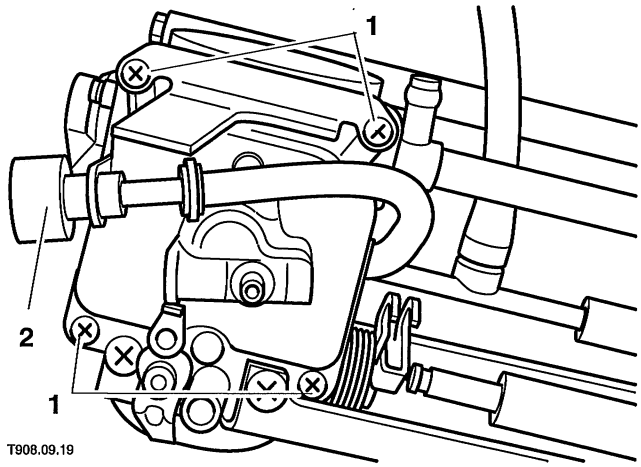
1. Piston assembly

4. Remove the retainer from the piston and tip out the needle.



1. Needle retainer

5. Undo the screws and remove the float chamber complete with its seal. Note the correct fitted location of the idle speed adjuster (left-hand carburettor only).



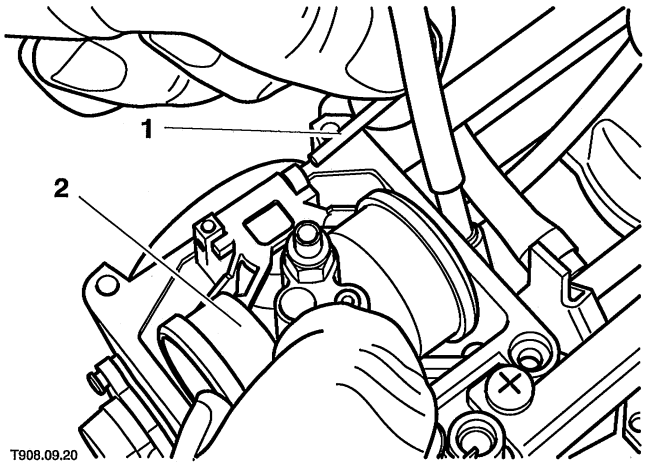
1. Float chamber screws

2. Idle speed adjuster

6. Remove the pivot pin and lift out the float and needle valve.

NOTE:

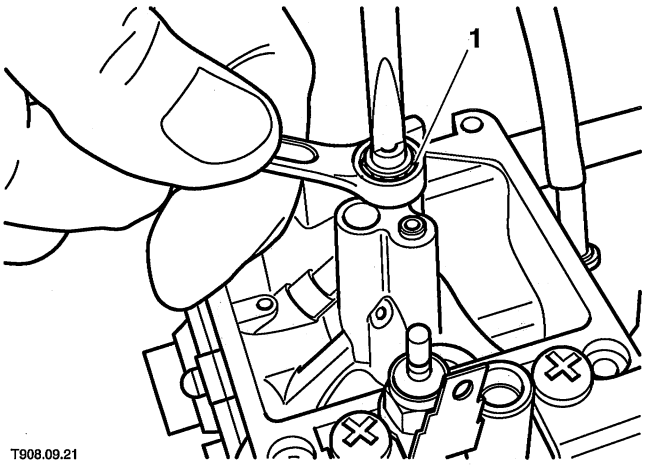
- **The needle valve seat is bonded in position.**



1. Pivot pin

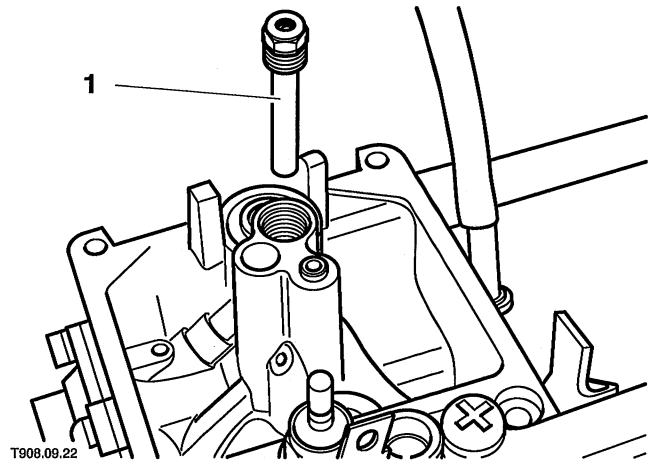
2. Float

7. Unscrew the main jet from the needle jet holder.



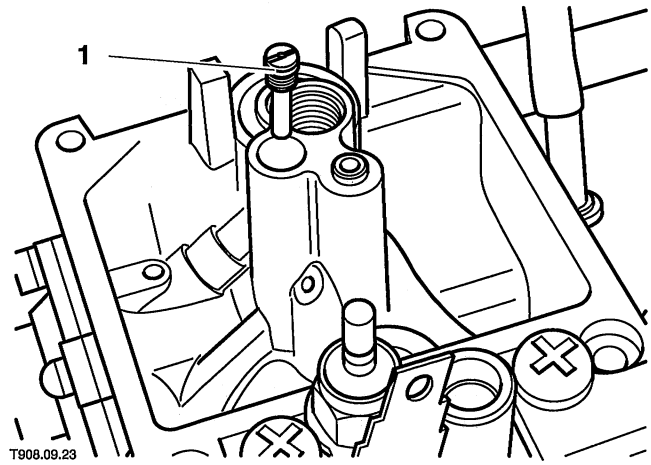
1. Main jet/holder

8. Unscrew the needle jet holder and tip out the needle jet, noting which way around it is fitted.



1. Needle jet holder

9. Using a small flat-bladed screwdriver, unscrew the pilot jet from the carburettor.

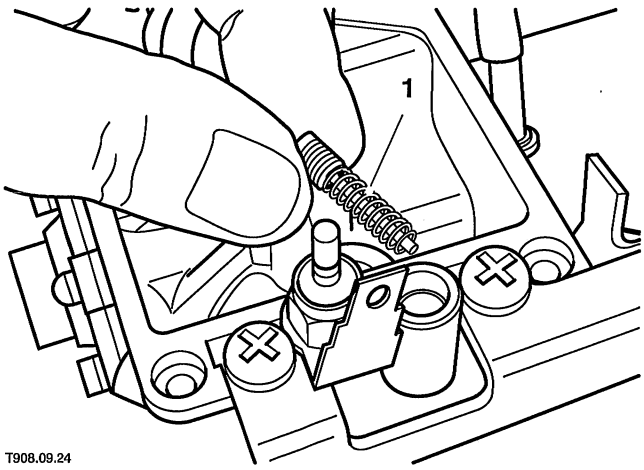


1. Pilot jet

10. Count the number of turns necessary to screw the pilot screw in until it gently seats (remember the number for use on assembly). Remove the pilot screw complete with its spring, washer and O-ring.

NOTE:

- **On US and Canada models the screw is located behind an anti-tamper plug which will have to be removed to gain access to the screw.**

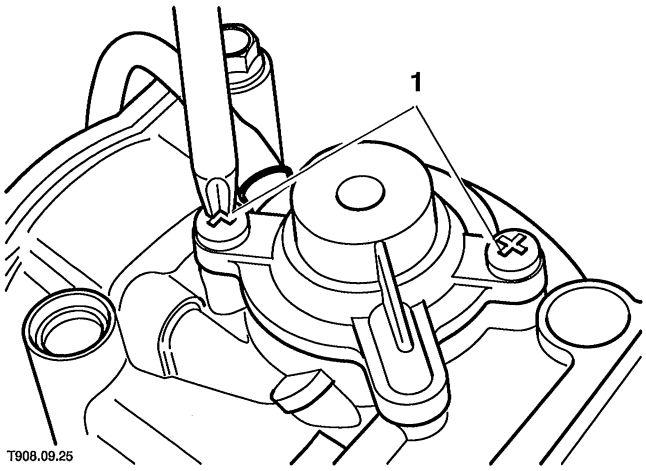


1. Pilot screw assembly

11. Undo the screws and washers securing the choke linkage rod to the carburettors. Remove the choke linkage rod and its return spring. Recover the washer fitted between the rod and each carburettor.

12. Unscrew the nut and remove the choke plunger mechanism from the carburettor.

13. On the left-hand carburettor, undo the screws and remove the air cut-off valve cover. Remove the spring, diaphragm and O-ring.



1. Air cut-off valve cover screws

Inspection

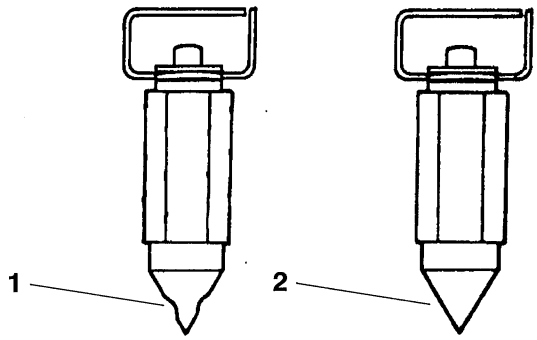
1. Inspect all jets and passages for blockages. Clear any blockages using compressed air.

WARNING: To prevent injury, always wear eye, face and ear protection when using compressed air.

2. Inspect the piston and air cut-off valve diaphragms closely for signs of damage or perforations. Renew if damaged.

3. Check the needle and needle jet for signs of wear/damage. Renew both items as a pair if wear is evident.

4. Inspect the needle valve for signs of wear or damage. Ensure the needle valve tip is undamaged and its spring-loaded rod operates correctly. Renew as necessary.



1. Worn needle valve tip

2. Serviceable needle valve tip

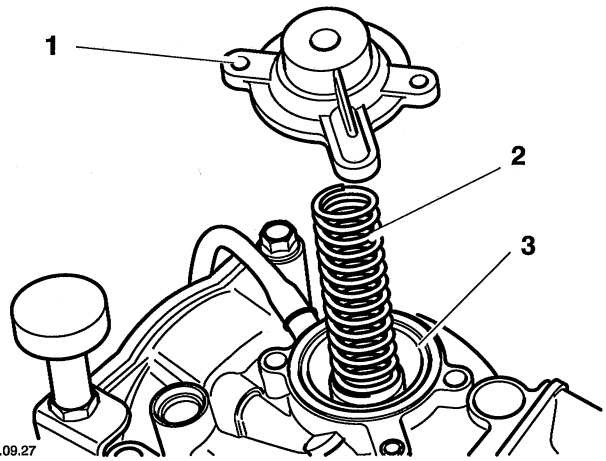
5. Check the pilot screw. Renew it if its tip is worn or bent.

6. Check the float assembly for signs of damage/leakage. Renew if necessary.

7. Check the choke plunger assembly for wear and renew as necessary.

Reassembly

1. On the left-hand carburettor, fit the air cut-off valve diaphragm with its pin towards the carburettor, and fit the O-ring. Install the spring and valve cover and securely tighten its retaining screws. Ensure the connecting hose linking the valve cover to the right-hand carburettor is securely connected.



T908.09.27

1. Cover

2. Spring

3. Valve diaphragm

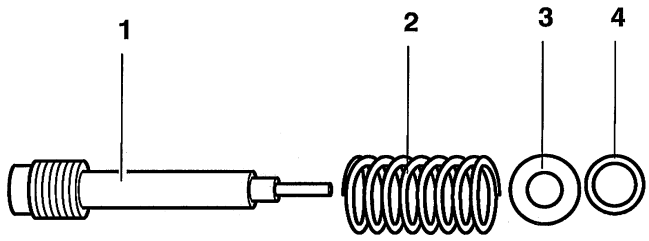
2. Insert the choke plunger assembly and securely tighten its retaining nut.

3. Fit a washer to each carburettor and install the choke linkage rod. Ensure the rod is correctly engaged with both choke plungers then fit the washers and screws, tightening them securely. Refit the return spring and check the operation of the choke linkage before proceeding.

4. Fit the spring, washer and O-ring to the pilot screw then fit the screw assembly. Screw the pilot screw in until it seats lightly then back it off by the number of turns noted prior to removal.

NOTE:

- **On US and Canada models, fit a new anti-tamper plug over the screw.**



T908.09.28

1. Pilot screw

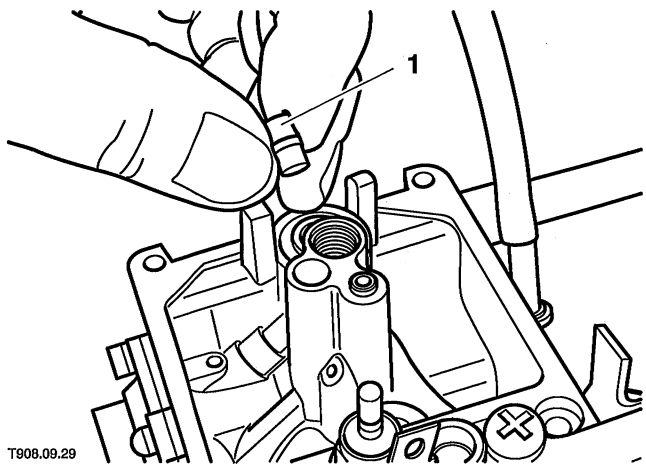
2. Spring

3. Washer

4. O-ring

5. Fit the pilot jet.

6. Fit the needle jet to the carburettor. Ensure the jet is correctly seated (if it is not fitted the right way around it will not seat correctly) then screw in the needle jet holder.

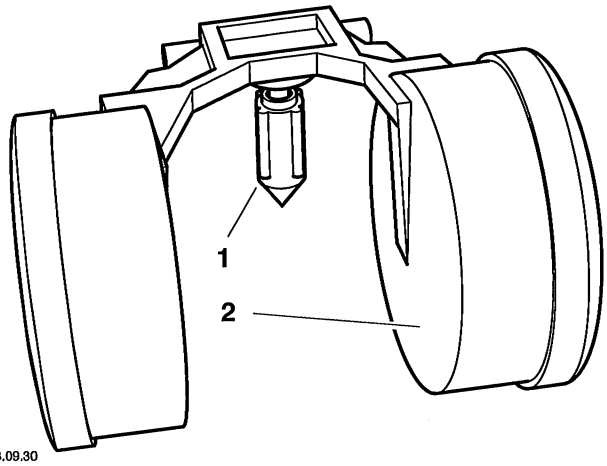


T908.09.29

1. Needle jet

7. Screw the main jet into the needle jet holder.

8. Hook the needle valve onto the float tang and fit the assembly to the carburettor. Ensure the needle valve is correctly located in the seat then insert the pivot pin.

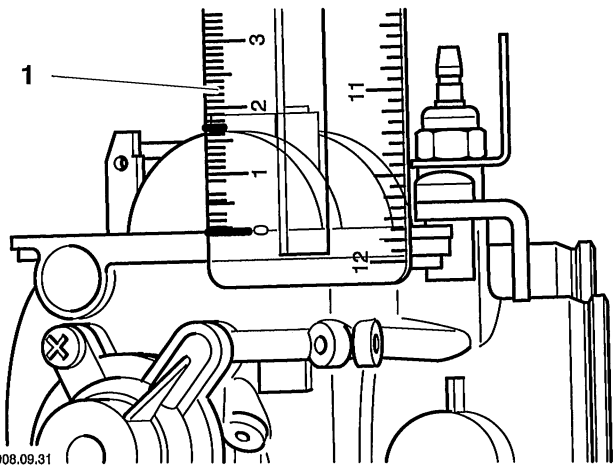


T908.09.30

1. Needle valve

2. Float

9. Check the float height as follows. Slowly invert the carburettor until the float tang contacts the needle valve rod and the valve is in contact with the seat. Ensure the needle valve spring-loaded rod is not compressed at all then measure the distance from the carburettor surface to the base (top as seen inverted) of the float. Adjustment is made by carefully bending the float tang.

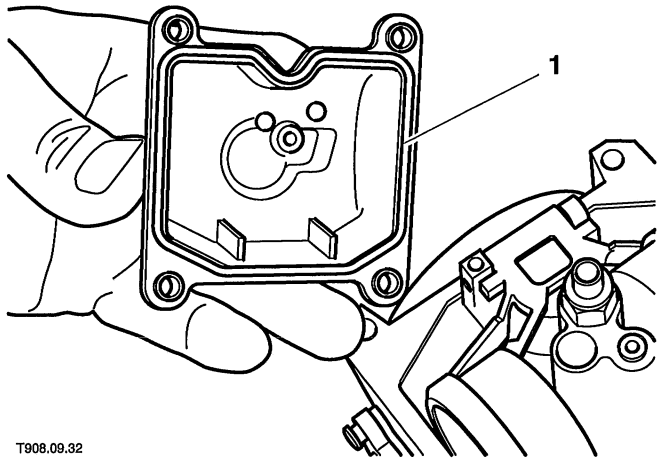


T908.09.31

1. Ruler for measuring 17 mm float height

Correct float height - 17 mm +/- 1 mm

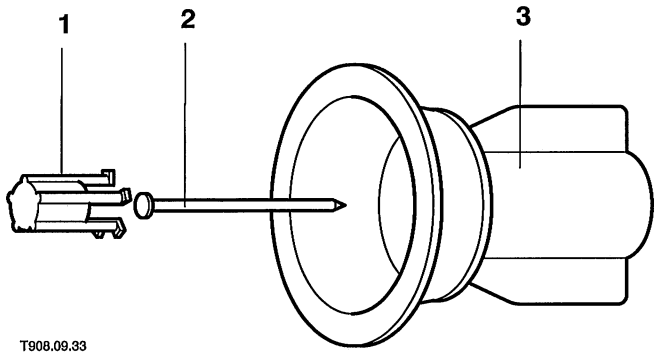
10. Fit the seal and install the float chamber. Ensure the seal is correctly located then securely tighten the retaining screws. On the left-hand carburettor ensure the idle speed adjuster is refitted to the screws.



T908.09.32

1. Seal

11. Insert the needle into the piston and fit the retainer. Position the retainer so that it does not block the air hole in the piston.



T908.09.33

1. Retainer

2. Needle

3. Piston

12. Fit the piston assembly (it will only fit one way) to the carburettor and seat the diaphragm in position.

13. Insert the spring into the piston then fit the vacuum chamber cover. Ensure the diaphragm is correctly seated then securely tighten the cover screws.

CARBURETTOR ADJUSTMENT

NOTE:

- **All carburettor adjustment should be made with the engine warmed up to normal operating temperature.**

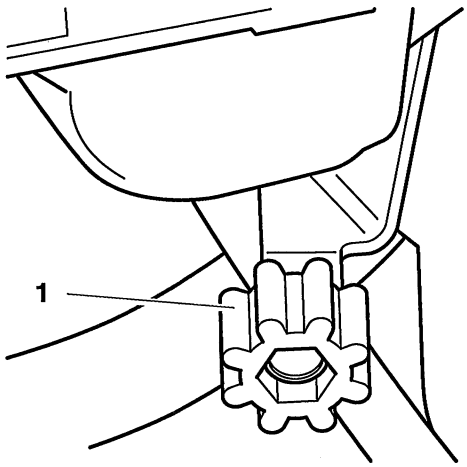
Idle speed adjustment

NOTE:

- **A tachometer will be needed to accurately set the idle speed.**

Idle speed is adjusted with the adjuster on the left-hand side of the carburettors. Rotate the adjuster clockwise to increase idle speed and anti-clockwise to decrease it.

CORRECT SETTING - 1000 ± 50 rpm



1. Idle speed adjuster

Idle mixture adjustment

WARNING: On US and Canada models anti-tamper plugs are fitted over the pilot screws to prevent adjustment. Any adjustment or deviation from the factory setting may cause the motorcycle to be in breach of State and Federal law. This would make the motorcycle illegal for road use and may also invalidate emission warranties.

The idle mixture adjustment is set during manufacture and should not be disturbed unless the carburettors have been overhauled.

Adjustment is made by altering the position of the pilot screws. Screw each pilot screw in until it seats lightly then back it out by the specified number of turns.

NOTE:

- **Idle mixture adjustment on models fitted with anti tamper type pilot screws requires the use of service tool T3880089. Earlier models may use tool 3880015-T0301**

Pilot screw setting:

	Bonneville, Bonneville T100 & Thruxton
Turns Out	2.5

	America & Scrambler
Turns Out	1.5

	Speedmaster
Turns Out	2.0

NOTE:

- **On models NOT fitted with a catalytic converter, if a gas analyzer is available, the idle mixture can be checked by measuring the CO content of the exhaust gases at the silencer outlet.**
- **On Bonneville, Bonneville T100 and Thruxton models where a catalyst is fitted. In order to correctly check the CO content of the exhaust gases, the gas analyzer probe must be inserted in the port on the exhaust header, not in the silencer outlet.**
- **On America, Scrambler and Speedmaster models where a catalyst is fitted, it is not possible to accurately check the CO content of the exhaust gases.**

CORRECT SETTING - 0.45 TO 3.0 % AT IDLE

NOTE:

- **The CO content must be checked with both the secondary air injection hoses securely clamped.**
- **The engine must be warmed up but not left at idle for periods above 5 minutes.**
- **It is not possible to accurately gauge the setting of each individual cylinder since the exhaust header pipes are joined by a balance pipe.**

Carburettor synchronisation

1. Warm the engine up to normal operating temperature and adjust the idle speed.

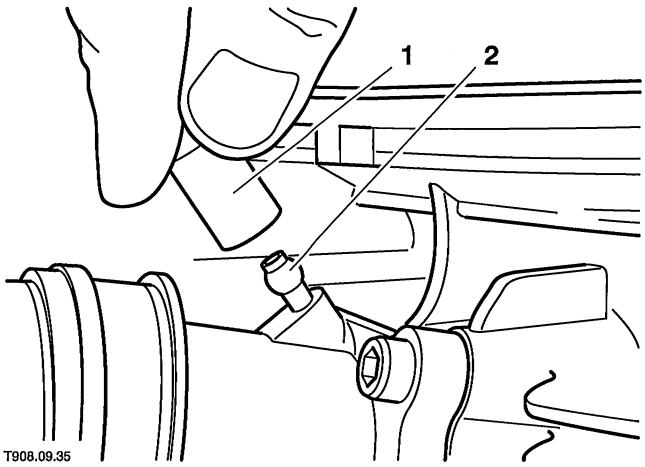
2. With the idle speed correctly set, switch off the engine.

3. Remove the rubber caps from the vacuum take-off points on the top of the intake adaptors.

NOTE:

- **On California models, disconnect the evaporative loss system hoses from the carburettor take-off points and plug the hose ends.**

WARNING: The engine will be hot. Take great care to avoid being scalded or burnt.



1. Rubber cap

2. Vacuum take-off point

4. Connect a pair of vacuum gauges to the carburettors.

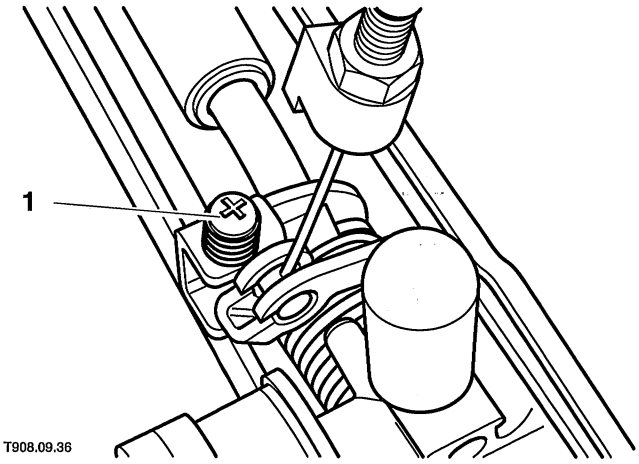
5. Start the engine and allow it to idle.

6. Open the throttle slightly a couple of times then allow the engine to idle again. Note the readings obtained on the gauges whilst doing this; both gauges should give the same vacuum reading.

7. If adjustment is necessary, rotate the throttle linkage adjustment screw which is located on the inside of the left carburettor.

NOTE:

- **Adjustment is very sensitive. Each time the screw is moved allow time for the vacuum readings to stabilise before adjusting the screw further.**



1. Throttle linkage adjustment screw

8. Once the carburettors are correctly synchronised, stop the engine and disconnect the vacuum gauges.

9. Securely refit the rubber caps/hoses (as applicable) to the intake adaptors.

FUEL LEVEL CHECK

WARNING: Observe the warning advice given in the general information section on the safe handling of fuel and fuel containers.

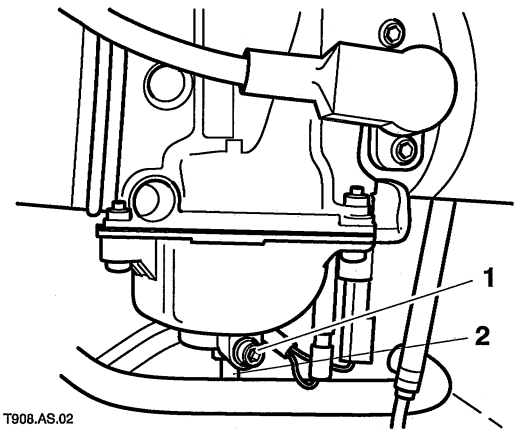
A fire, causing personal injury and damage to property could result from spilled fuel or fuel not handled or stored correctly.

1. Place the motorcycle on level ground and securely support it in an upright position.

WARNING: Ensure the motorcycle is stabilised and adequately supported, to prevent it falling and causing damage or injury.

2. Turn the fuel tap OFF.

3. Slacken the drain screw and drain the fuel from the carburettor into a suitable container. When the carburettor is empty, retighten the drain screw.



1. Drain screw

2. Drain point

4. Attach a length of hose to the drain point on the base of the float chamber and fit the fuel level gauge 3880125-T0301 to the hose end.

5. Position the fuel level gauge vertically next to the carburettor with its scale above the float chamber.

6. Turn the fuel tap ON to refill the carburettor with fuel then slacken the drain screw.

7. Allow the level of the fuel to stabilise then slowly lower the gauge until the fuel level is visible. Ensure the gauge is vertical then measure the fuel level.

NOTE:

- **Never lower the gauge then raise it again as this will result in a false reading. If the gauge is lowered too far, tighten the drain screw then empty the contents of the tube and start again.**

- **Fuel level 2 mm +/- 1 mm above float chamber mating surface**

8. Once measurement has been obtained, securely tighten the drain screw and remove the fuel gauge and hose.

9. Repeat the check on the other carburettor.

10. If adjustment is necessary, remove the carburettors and adjust the float height (see carburettor overhaul). Increasing the float height will lower the fuel level and decreasing it will raise the fuel level.

CARBURETTOR HEATING SYSTEM

General information

Each carburettor is fitted with a heating element to prevent problems at low temperatures. The system is controlled by a temperature switch which is clipped to the right side of the airbox.

1. Carburettor heating system temperature switch

At low ambient temperatures (below approximately 10°C), the temperature switch supplies electrical current to the heating element on each carburettor. The heating elements then warm the carburettor bodies.

At higher ambient temperatures, no heating is required and the temperature switch cuts off the electrical supply to the heating elements.

SECONDARY AIR INJECTION SYSTEM

The secondary air injection system reduces the level of pollutants emitted in the exhaust gases. The system is operated by the control valve assembly located under the fuel tank and functions as follows.

When the engine is running, the vacuum present in the intake port opens up the control valve diaphragm. Every time there is a negative pulse in the exhaust port, the control valve then allows clean air to be drawn from the airbox into the port. This air causes secondary combustion of the exhaust gases in the exhaust ports, reducing the amount of unburnt hydrocarbons released into the atmosphere in the exhaust gases.

The control valve assembly contains two reed valve assemblies (one for each cylinder) to prevent the exhaust gases travelling from the exhaust port back to the airbox.

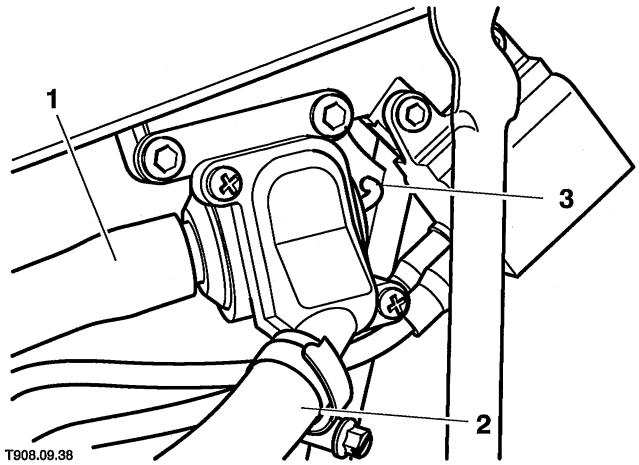
Check

1. At regular intervals (see maintenance schedule), disassemble the control valve and inspect the reed valve assemblies. Renew the valves if there is any doubt about their condition.

SECONDARY AIR INJECTION SYSTEM CONTROL VALVE

Removal

1. Remove the fuel tank.
2. Disconnect all hoses from the valve, noting the correct fitted location of each hose.



1. Airbox hose

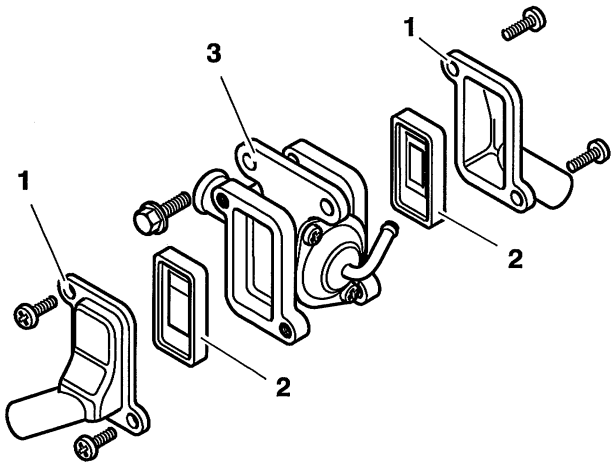
2. Cylinder head hose

3. Vacuum hose

3. Unscrew the mounting bolts and remove the control valve.
4. Undo the screws and remove the covers and reed valve assemblies from the valve.

NOTE:

- **The covers are different and are not interchangable.**



1. Covers

2. Reed valves

3. Valve body

Inspection

1. Inspect each reed valve assembly for signs of wear or damage. If there are signs of exhaust gases blowing past the valve, it must be renewed.
2. Check that the control valve assembly only allows air to flow through the airbox union when a vacuum is applied to its diaphragm. If not, renew the valve.

Installation

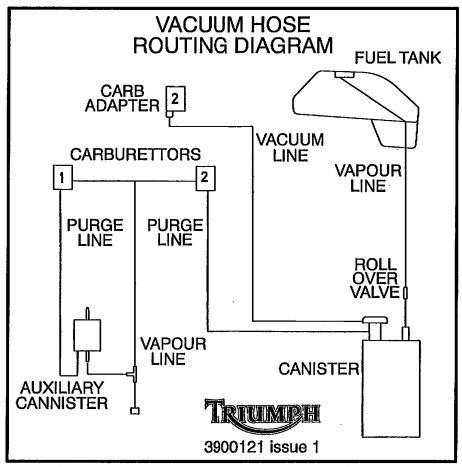
1. Seat the reed valve assemblies in the control valve (they will only fit one way) and install the covers. Ensure the covers are correctly fitted then securely tighten the retaining screws.
2. Fit the control valve to the frame and tighten its mounting bolts to **8 Nm.**
3. Securely reconnect all the hoses to the control valve.
4. Install the fuel tank.

EVAPORATIVE LOSS SYSTEM - CALIFORNIA MODELS

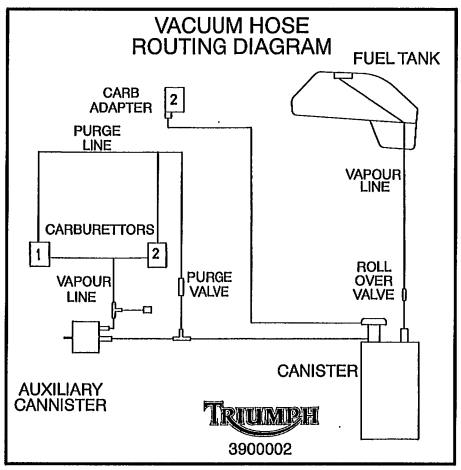
General information

All California models are fitted with an evaporative loss control system. The system is fitted to ensure that fuel vapour in the fuel tank or carburettor float chambers cannot escape to atmosphere at any time. Instead, when the engine is not running, the vapour is 'stored' in two charcoal canisters. Under certain engine conditions, fuel vapour is drawn by vacuum from the canisters into the engine combustion chambers.

A label, as shown below, can be found on all 790cc models equipped with an evaporative control system.



A label, as shown below, can be found on all 865cc models equipped with an evaporative control system.



Evaporative loss system operation - engine switched off

When the engine is switched off, any pressure increase in the fuel tank due to a rise in ambient temperature will cause fuel vapour to pass down through the roll over valve, to the primary charcoal canister.

Because the float chamber vent solenoid is closed (to prevent vapour escaping to the atmosphere), fuel vapour will pass to the secondary canister.

Any liquid fuel which condenses in the system is collected in the liquid fuel collection point and is drained out at each service.

The canisters store fuel vapour until the engine is started.

Evaporative loss system operation - engine running

790cc engines

When the engine is started, vacuum is applied to the vacuum diaphragm on the primary charcoal canister. This causes the vacuum diaphragm to open which allows fuel vapour to be drawn from the primary canister into the engine to be burnt. At the same time any vapour stored in the secondary canister is also purged.

865cc engines

When the engine is at idle no fuel vapour is allowed into the engine from the primary canister. When the engine speed rises above a set level, valves open in the system to allow fuel vapour from the primary canister to be drawn into the engine to be burnt. At the same time any vapour stored in the secondary canister is also purged.

Both engines

Restrictors in pipes limit the effective size of the pipes and help to maintain the balance of air being drawn into the carburettors.

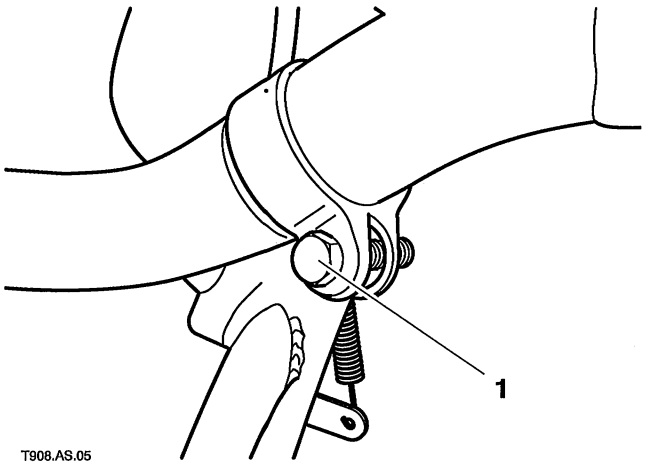
To allow air to enter the float chambers, the float chamber vent solenoid valve opens. Because air is constantly being drawn into the chambers while the engine is running, no fuel vapour escapes.

As the volume of fuel in the fuel tank reduces, air enters the tank through a one way valve in the filler cap. Because the valve opens in one direction only, it allows air to enter the tank but does not allow vapour to escape.

SILENCERS - BONNEVILLE, BONNEVILLE T100 & THRUXTON

Removal

1. Slacken the clamp securing the silencer to the header pipe (on Thruxton models remove the clamp shield if retained by the clamp).

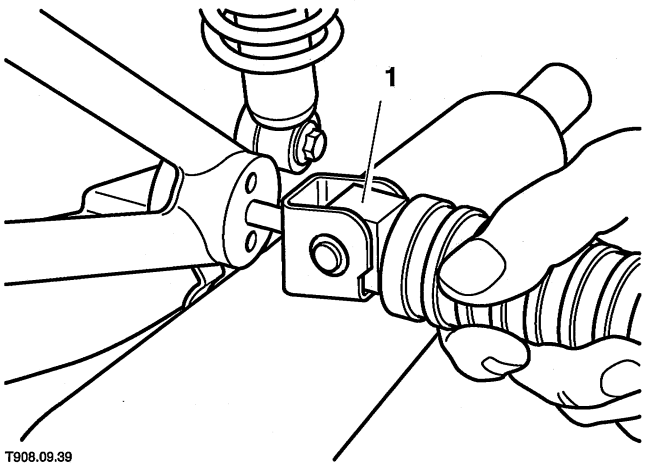


T908.AS.05

1. Silencer clamp bolt

2. Slacken and remove the nut and washer from the rear passenger footrest.

3. Withdraw the passenger footrest and remove the silencer from the motorcycle. Recover the rubber washer, shouldered collar and mounting rubber from the silencer mounting bracket.

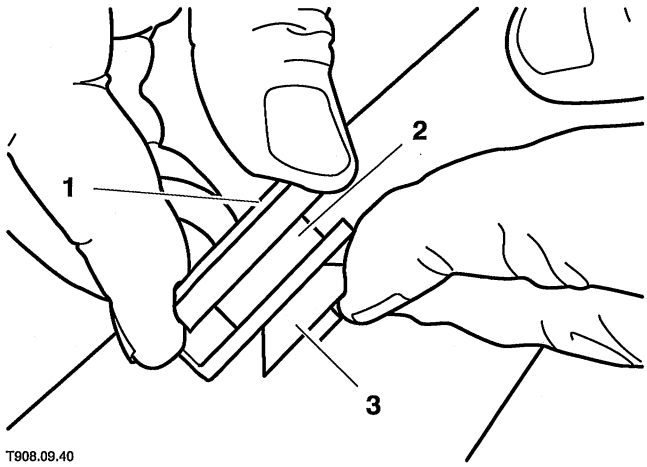


T908.09.39

1. Passenger footrest

Installation

1. Ensure the rubber mounting, collar and rubber washer are correctly fitted to the silencer bracket.



T908.09.40

1. Collar

2. Rubber mounting

3. Rubber washer

2. Apply 4cc of clear silicone sealer to each header pipe at the joint with the silencer. Spread the sealer evenly all round the joint.

3. Fit the mounting clamp (on Thruxton models, if removed, fit the clamp shield) then install the silencer.

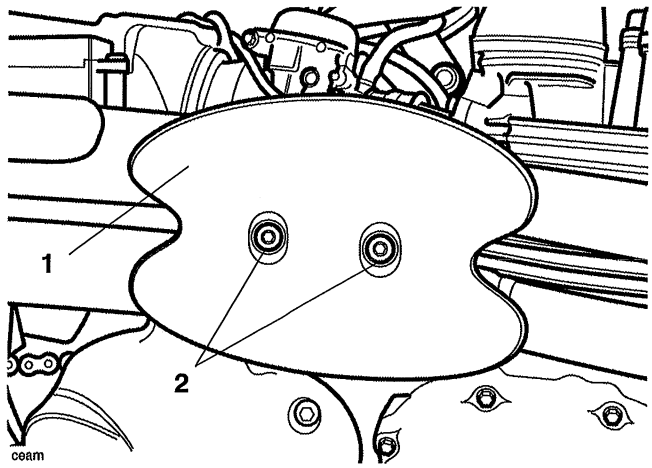
4. Install the passenger footrest, ensuring its locating pegs are correctly seated in their holes. Fit the washer and nut to the footrest and tighten to **27 Nm**.

5. Position the silencer clamp correctly and tighten its bolt to **22 Nm**.

SILENCERS - SCRAMBLER

Removal

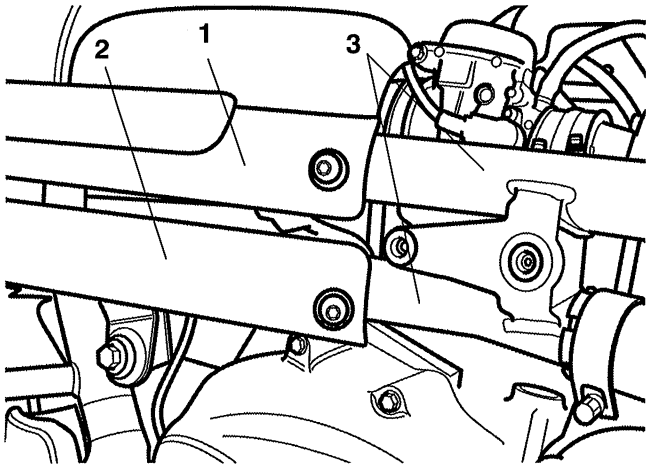
1. Undo and remove the two fixings securing the calf protector to the bracket on the header pipes. Remove the calf protector.



1. Calf protector

2. Fixings

2. Undo and remove the fixing securing the upper side protector to the header pipes.

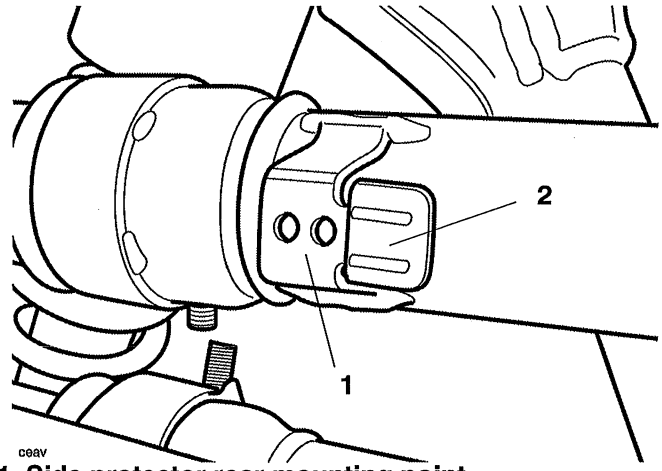


1. Upper side protector

2. Lower side protector

3. Header pipes

3. Pull the side protector towards the front of the motorcycle to release it from its rear mounting point collecting the mounting point rubber as you do so.

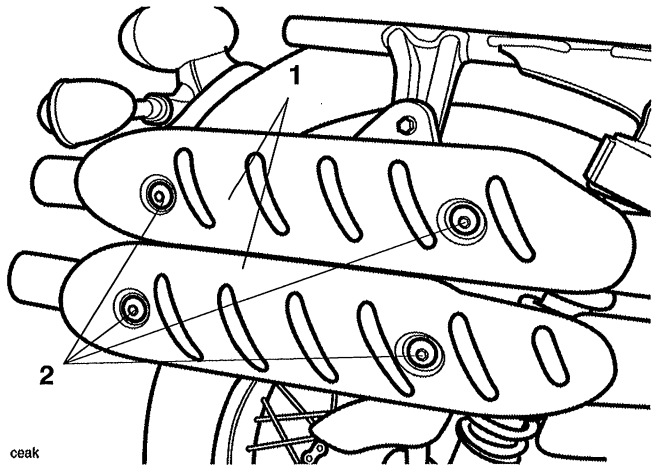


1. Side protector rear mounting point

2. Mounting point rubber

4. Remove the lower side protector in the same manner.

5. To help prevent damage, remove the fixings securing the silencer covers to the silencers. Remove the covers.



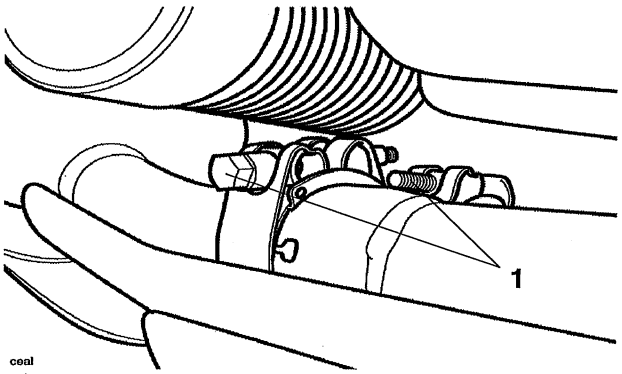
1. Silencer covers

2. Fixings

6. Slacken both clamps securing the silencers to the header pipes.

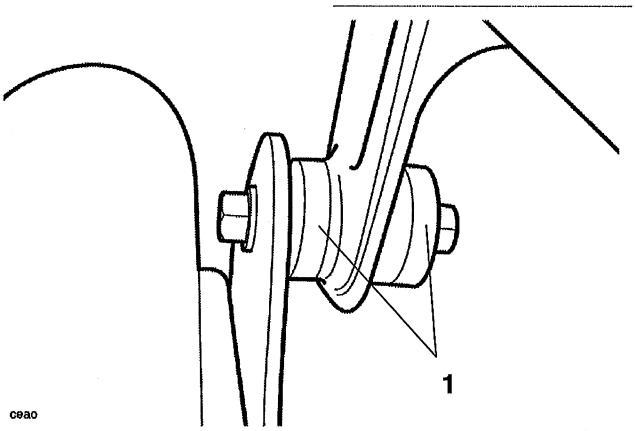
NOTE:

- **Note the orientation of the clamps prior to removal.**



1. Silencer clamp bolts

7. Noting the position of the spacers if fitted, slacken and remove the bolt, nut and spacers securing the silencer plate to the frame.



1. Spacers (if fitted)

8. Remove the silencers from the header pipes.

9. To separate the silencers, undo and remove the fixings securing both silencers to the silencer plate.

NOTE:

- **Note the orientation prior to removal.**

Installation

1. Secure both silencers to the silencer mounting plate and tighten all four fixings to **15 Nm.**

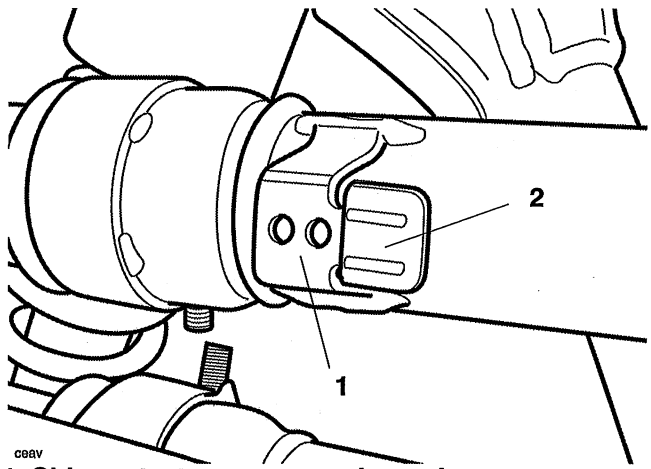
2. Apply 4cc of clear silicone sealer to each silencer at the joints with the header pipes. Spread the sealer evenly around the joints.

3. Position the silencers to the header pipes and secure the silencer plate to the frame. Ensuring that the fixings are in the positions noted during removal. Tighten the bolt and nut to **19 Nm.**

4. Position both silencer clamps as noted earlier and tighten their bolts to **10 Nm.**

5. Fit the silencer covers and tighten their fixings to **17 Nm.**

6. Fit the mounting point rubbers, collected during removal, to the rear mounting points.



1. Side protector rear mounting point

2. Mounting point rubber

7. Secure the upper side cover to the frame ensuring that the hook at the rear of the cover engages in its rear mounting point. Tighten the front fixing to **5 Nm.**

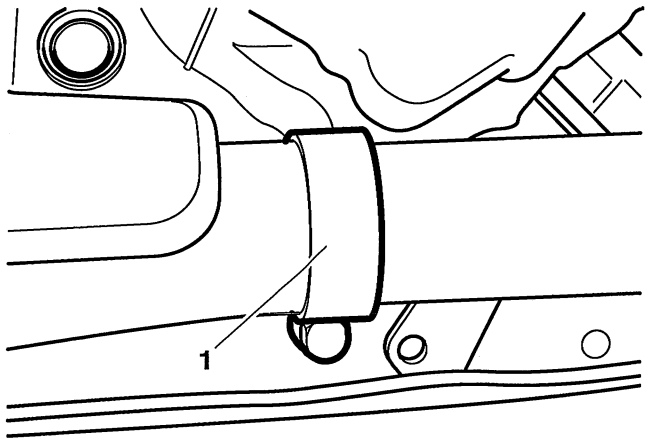
8. Fit the lower side cover in the same manner.

9. Fit the calf protector to the bracket on the header pipes tightening the fixings to **5 Nm.**

SILENCERS - AMERICA & SPEEDMASTER

Removal

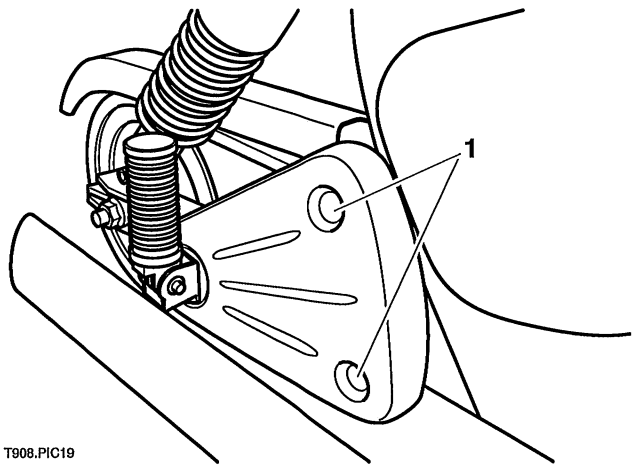
1. Slacken the clamp securing the silencer to the header pipe.



T908.PIC18

1. Silencer clamp bolt

2. Slacken and remove the two fixings securing the passenger footrest mounting plate to the frame.



T908.PIC19

1. Passenger footrest mounting plate fixings

3. Remove the passenger footrest mounting plate.

4. Rotate the silencer away from the frame in order to dislodge the silencer mounting.

5. With the silencer mounting clear of the frame, withdraw the silencer from the header pipe.

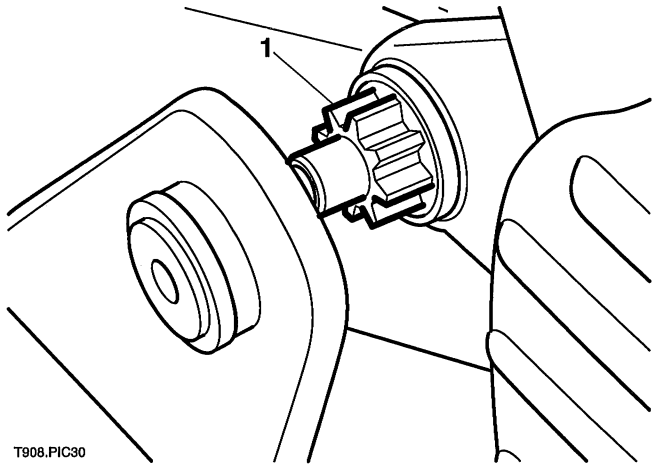
Installation

1. Ensure the rubber mountings fitted to the mounting spigot.

2. Apply 4cc of clear silicone sealer to each header pipe at the joint with the silencer. Spread the sealer evenly all round the joint.

3. Fit the mounting clamp then install the silencer to the header.

4. Rotate the silencer until the mounting plate engages correctly with the mounting spigot/rubber.



T908.PIC30

1. Silencer mounting spigot/rubber

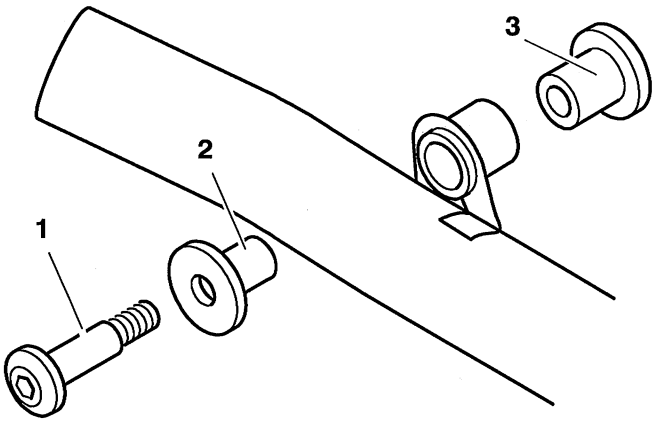
5. Install the passenger footrest mounting plate. Fit the fixings and tighten to **27 Nm.**

6. Position the silencer clamp correctly and tighten its bolt to **22 Nm.**

HEADER PIPES - BONNEVILLE, BONNEVILLE T100 & THRUXTON

Removal

1. Remove both silencers.
2. Remove the right hand side cover.
3. Unscrew the bolts and remove the sprocket cover from the engine.
4. Remove the cap and slacken the swinging arm outrigger clamp bolt on the right side rider footrest bracket.
5. Unscrew the right side footrest bracket mounting bolts and the rear brake master cylinder mounting bolts.
6. Free the footrest bracket from the swinging arm outrigger and position it clear of the header pipe mounting bolt.
7. Slacken the clamp securing the header balance pipes together.
8. Unscrew the nuts securing both header pipes to the cylinder head.
9. Unscrew the mounting bolt from the rear of each header pipe.



1. Mounting bolt

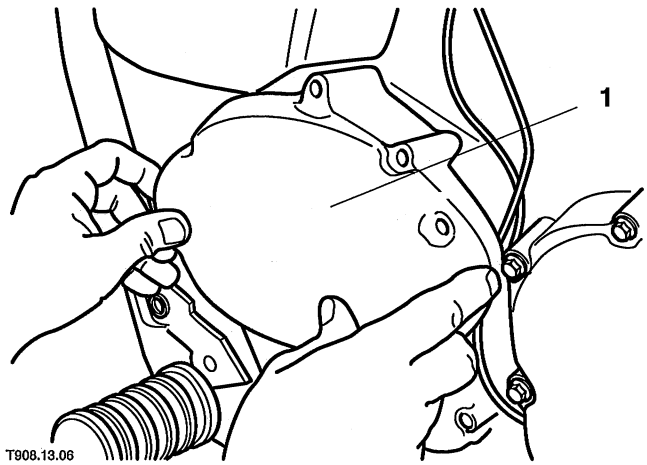
2. Collar

3. Rubber mounting

10. Free the header pipes from the cylinder head, separate the balance pipe and remove both pipes from the motorcycle. Recover the rubber mountings from each header pipe rear mounting.
11. Remove the gasket from each cylinder head port and discard them.

Installation

1. Fit a **new** gasket to each cylinder head port.
2. Apply a light smear of silicone sealer to each header pipe at the joint with the head.
3. Ensure the rubber mountings are correctly fitted to the header mountings and fit the clamp to the balance pipe.
4. Fit both header pipes, joining the balance pipe whilst locating both headers correctly in the cylinder head ports. Fit the nuts to the cylinder head studs, and lightly tighten them.
5. Install the header mounting bolts and tighten to **22 Nm.**
6. Tighten the header pipe nuts evenly and progressively to **19 Nm.**
7. Position the balance pipe clamp correctly and tighten its bolt to **22 Nm.**
8. Locate the footrest bracket back on the outrigger and tighten the bracket mounting bolts to **27 Nm.** Tighten the clamp bolt to **45 Nm** then refit the cap.
9. Refit the master cylinder mounting bolts and tighten to **27 Nm.**
10. Install the sprocket cover, tightening the cover bolts to **9 Nm.**



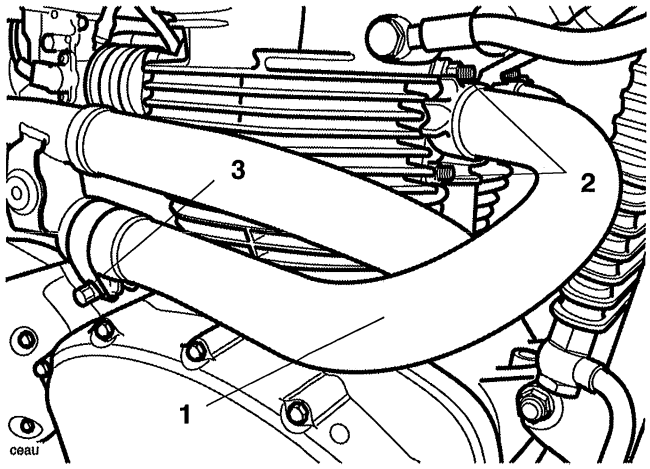
1. Sprocket cover

11. Install the silencers and side cover.

HEADER PIPES - SCRAMBLER

Removal

1. Remove the silencers.
2. Slacken and remove the two nuts securing the right-hand header pipe to the cylinder head.

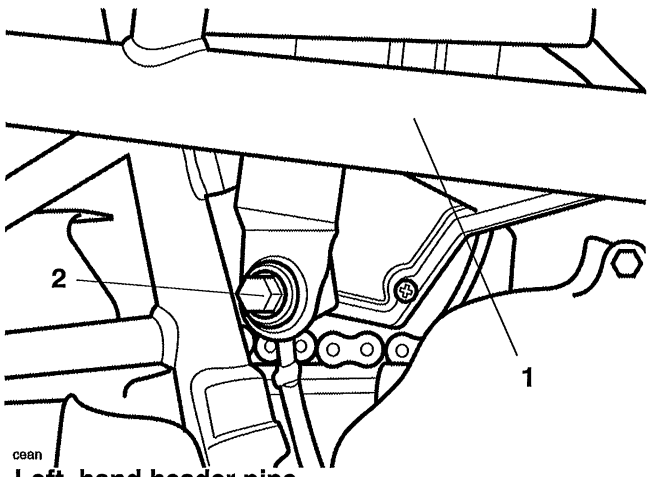


1. Right-hand header pipe

2. Nuts

3. Header pipe clamp

3. Slacken the header pipe clamp.
4. Remove the right-hand header pipe.
5. Slacken and remove the two nuts securing the left-hand header pipe to the cylinder head.
6. Noting the position of the rubber washers, slacken and remove the fixing securing the left-hand header pipe to the frame. Remove the header pipe.

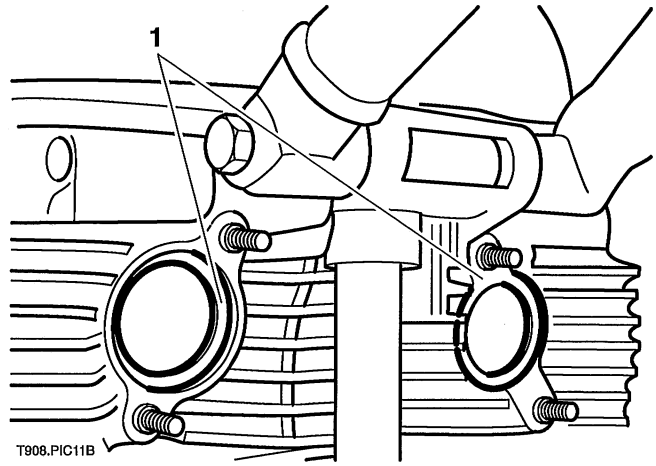


1. Left-hand header pipe

2. Fixing

Installation

1. Fit a **new** gasket to each cylinder head port.



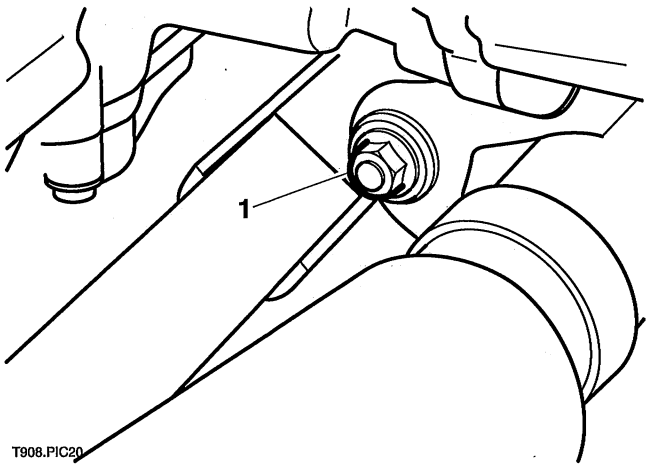
1. Gasket

2. Apply a light smear of silicone sealer to each header pipe at the joint with the head.
3. Position the left-hand header pipe to the cylinder head. Secure to the frame tightening the fixing to **19 Nm,** ensuring that the rubber washers are fitted in the positions noted prior to removal.
4. Fit the nuts to the cylinder head studs on the left-hand side. Tighten the nuts to **19 Nm.**
5. Position the right-hand header pipe to the cylinder head and abut to the left-hand header pipe.
6. Join both header pipes using the header pipe clamp. Tighten the clamp bolt to **10 Nm.**
7. Fit the nuts to the cylinder head studs on the right-hand side. Tighten the nuts to **19 Nm.**
8. Refit the silencers.

HEADER PIPES - AMERICA & SPEEDMASTER

Removal

1. Remove both silencers.
2. Remove the fixings securing the header pipes to the frame cradle tubes.

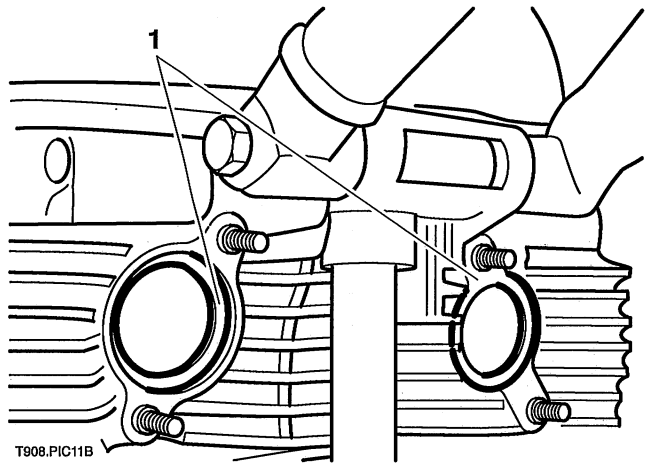


1. Header fixing

3. Release the nuts securing each header pipe to the cylinder head.
4. Slacken the clamp securing the balance pipes to each other.
5. Free the header pipes from the cylinder head, separate the balance pipes and remove both header pipes from the motorcycle.
6. Remove the gasket from each cylinder head port and discard them.

Installation

1. Fit a **new** gasket to each cylinder head port.



1. Gasket

2. Apply a light smear of silicone sealer to each header pipe at the joint with the head.
3. Fit both header pipes, joining the balance pipe whilst locating both headers correctly in the cylinder head ports.
4. Fit the nuts to the cylinder head studs but do not fully tighten them yet.
5. Install the header to cradle tube mounting fixings but do not fully tighten them yet.
6. Tighten the header pipe nuts evenly and progressively to **19 Nm.**
7. Tighten the header mounting fixings to **15 Nm.**
8. Position the balance pipe clamp correctly and tighten its bolt to **22 Nm.**
9. Refit the silencers.

BRAKES

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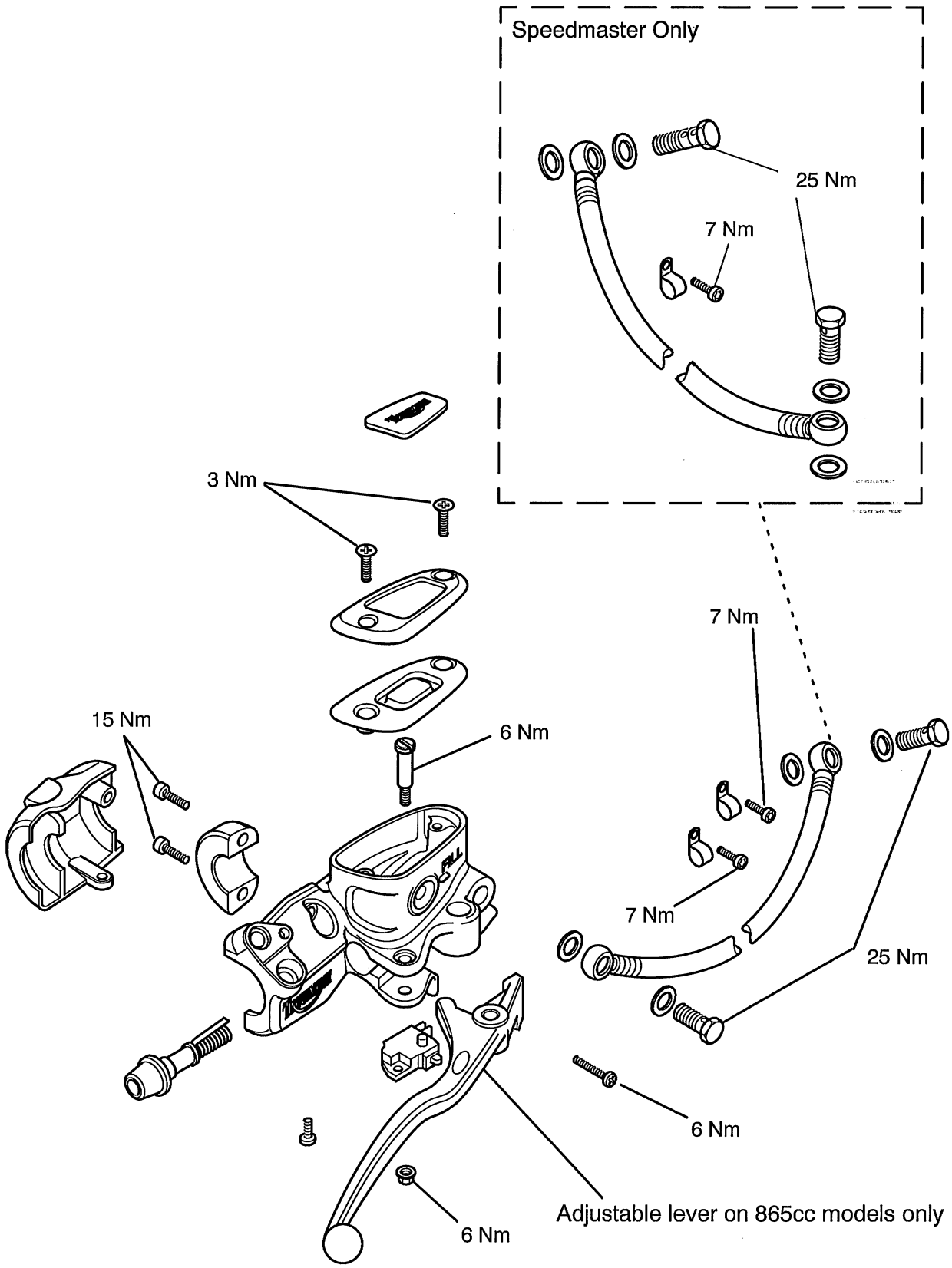
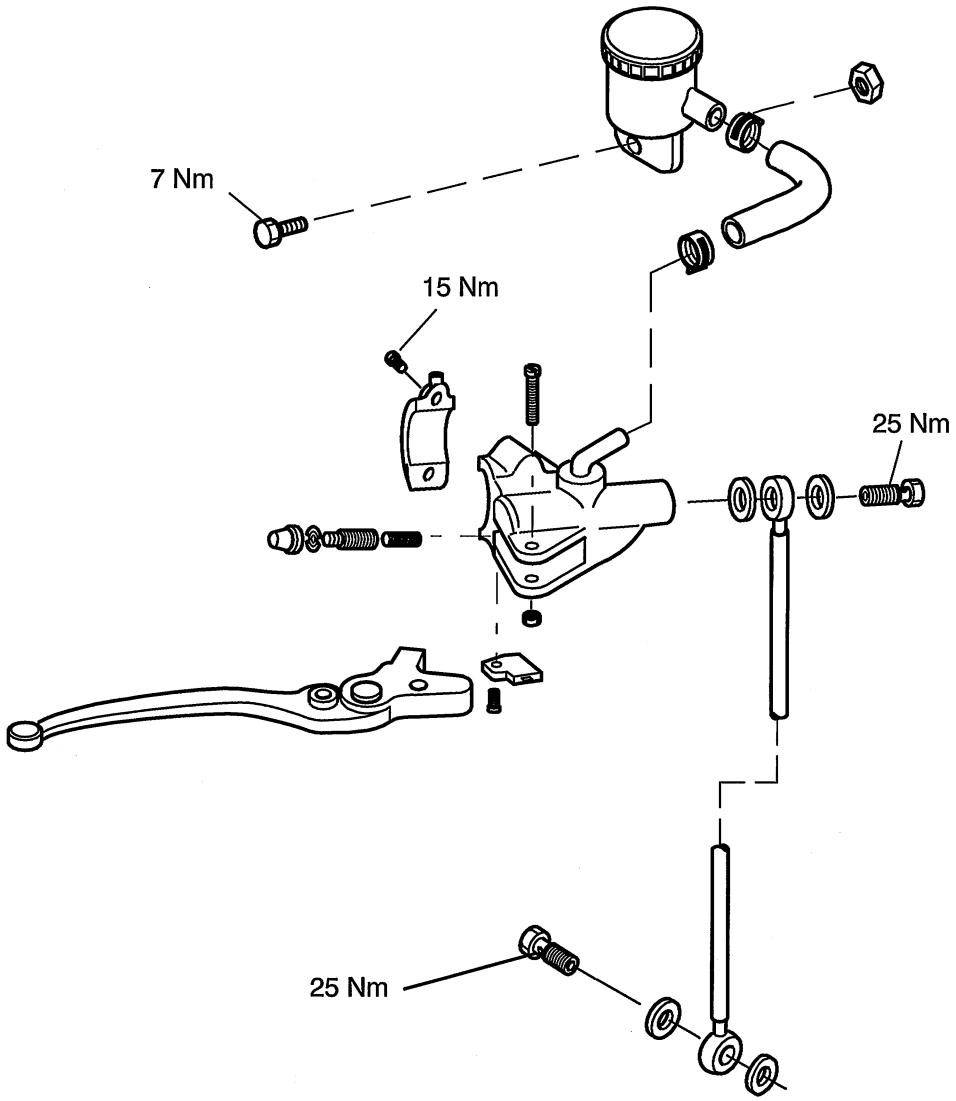
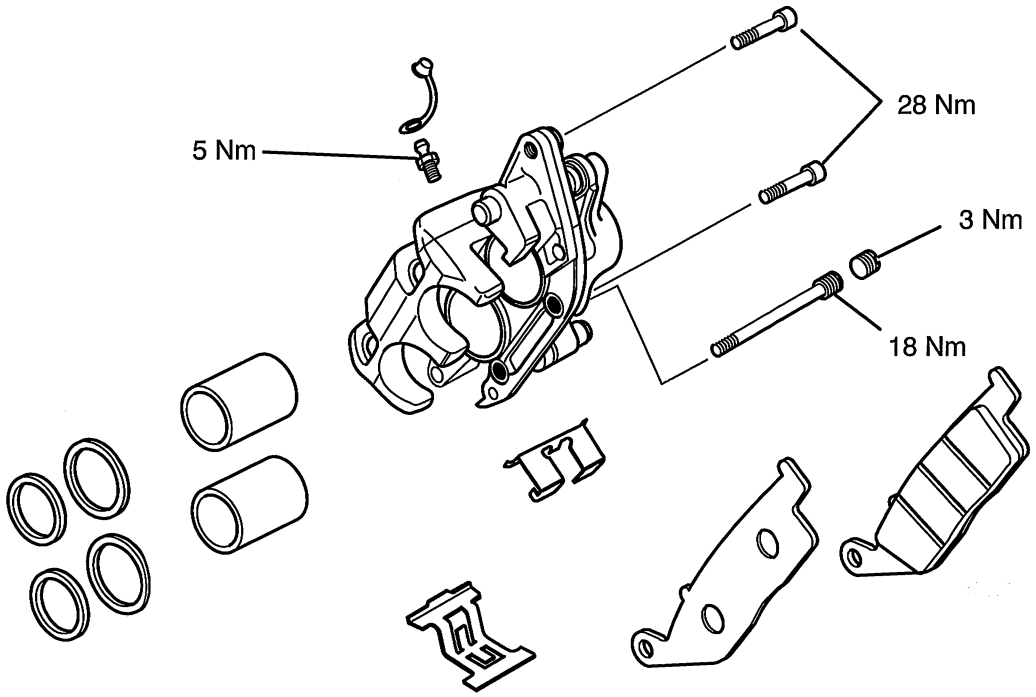
Exploded View
Front Brake Master Cylinder and Hose - All Models Except Thruxton & Scrambler

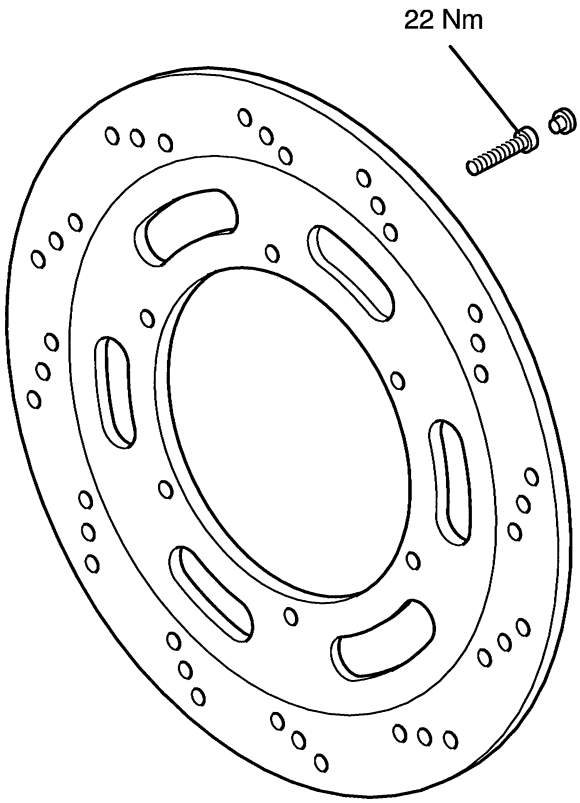


Exploded View
Front Brake Master Cylinder and Hose - Thruxton & Scrambler

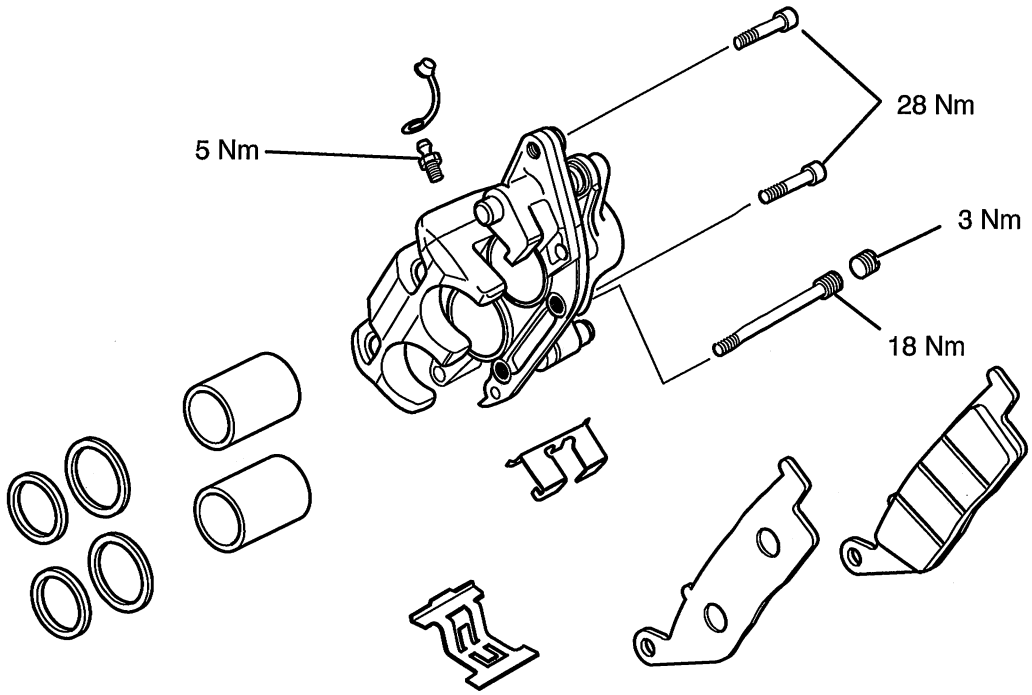


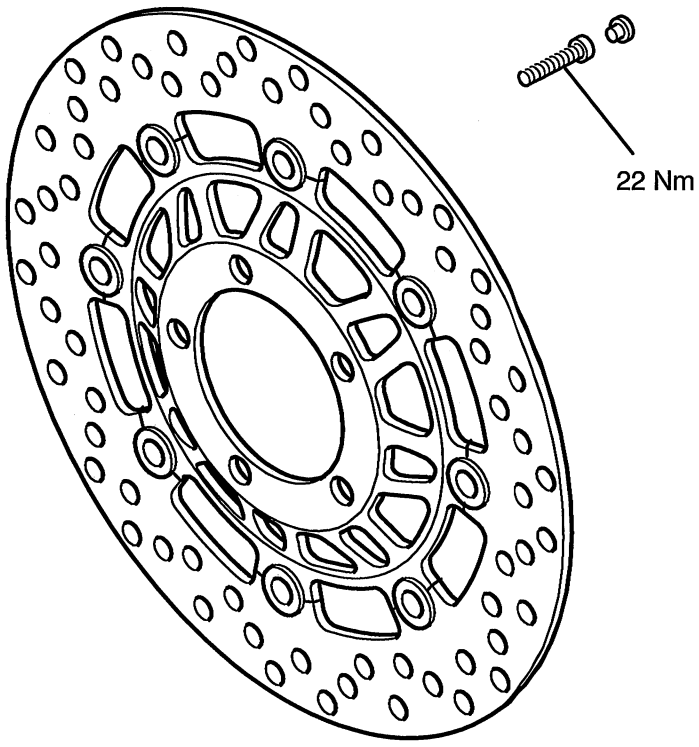
Exploded View
Front Brake Caliper and Disc - All Models Except Speedmaster & Thruxton



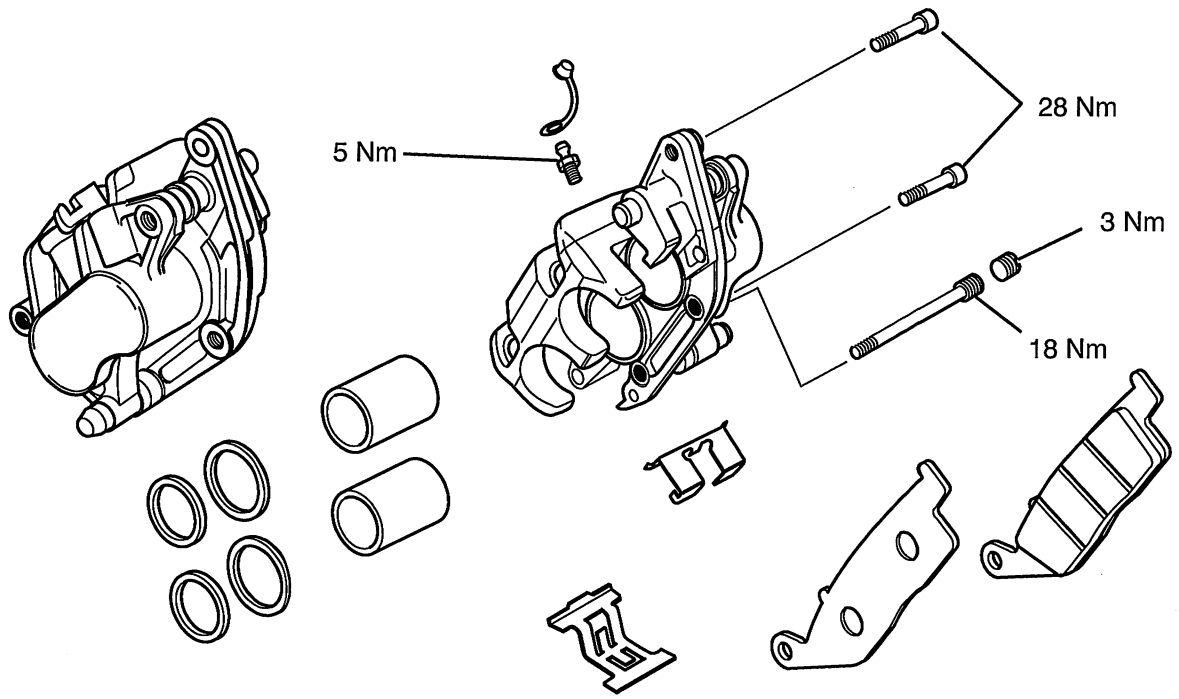


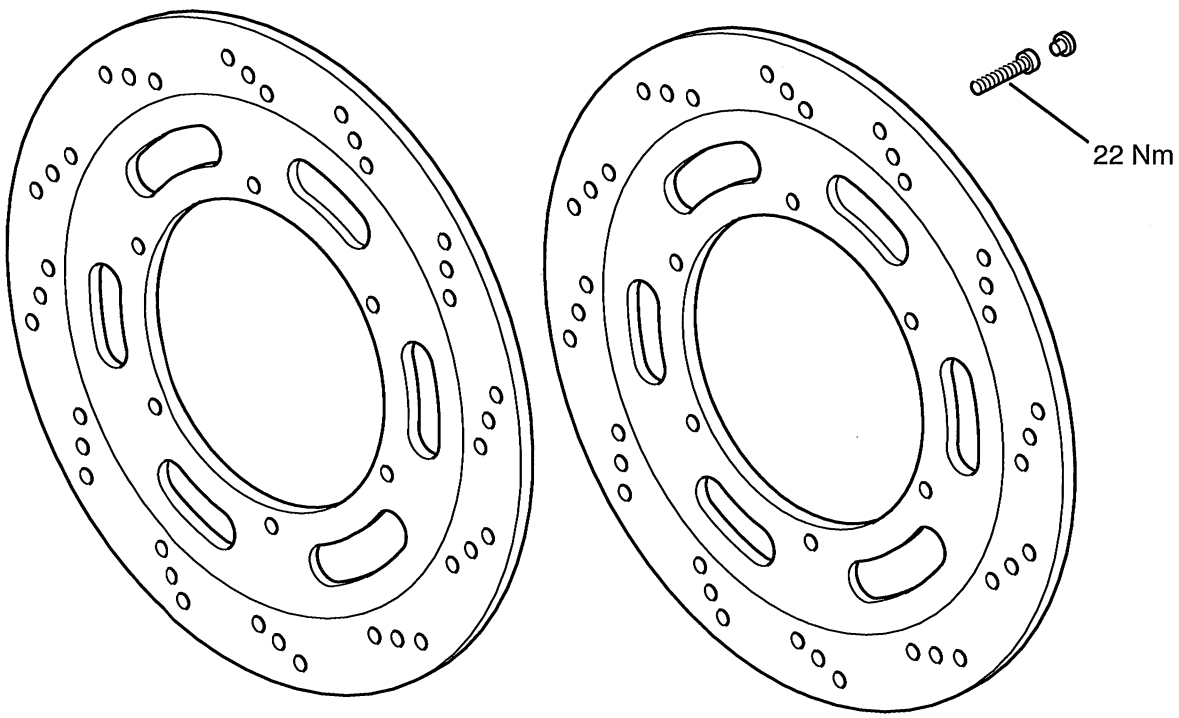
Exploded View
Front Brake Caliper and Disc - Thruxton



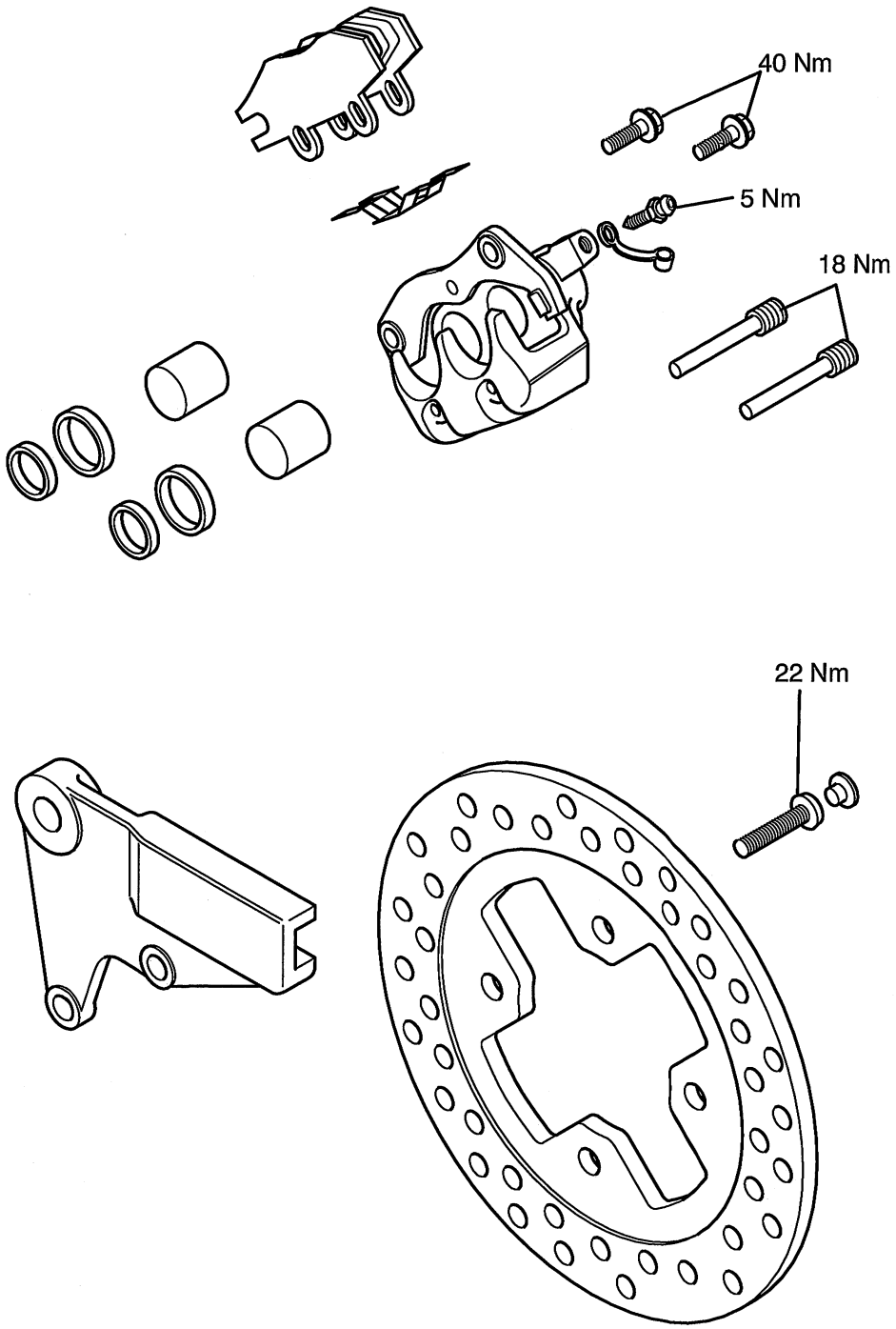


Exploded View
Front Brake Calipers and Discs - Speedmaster

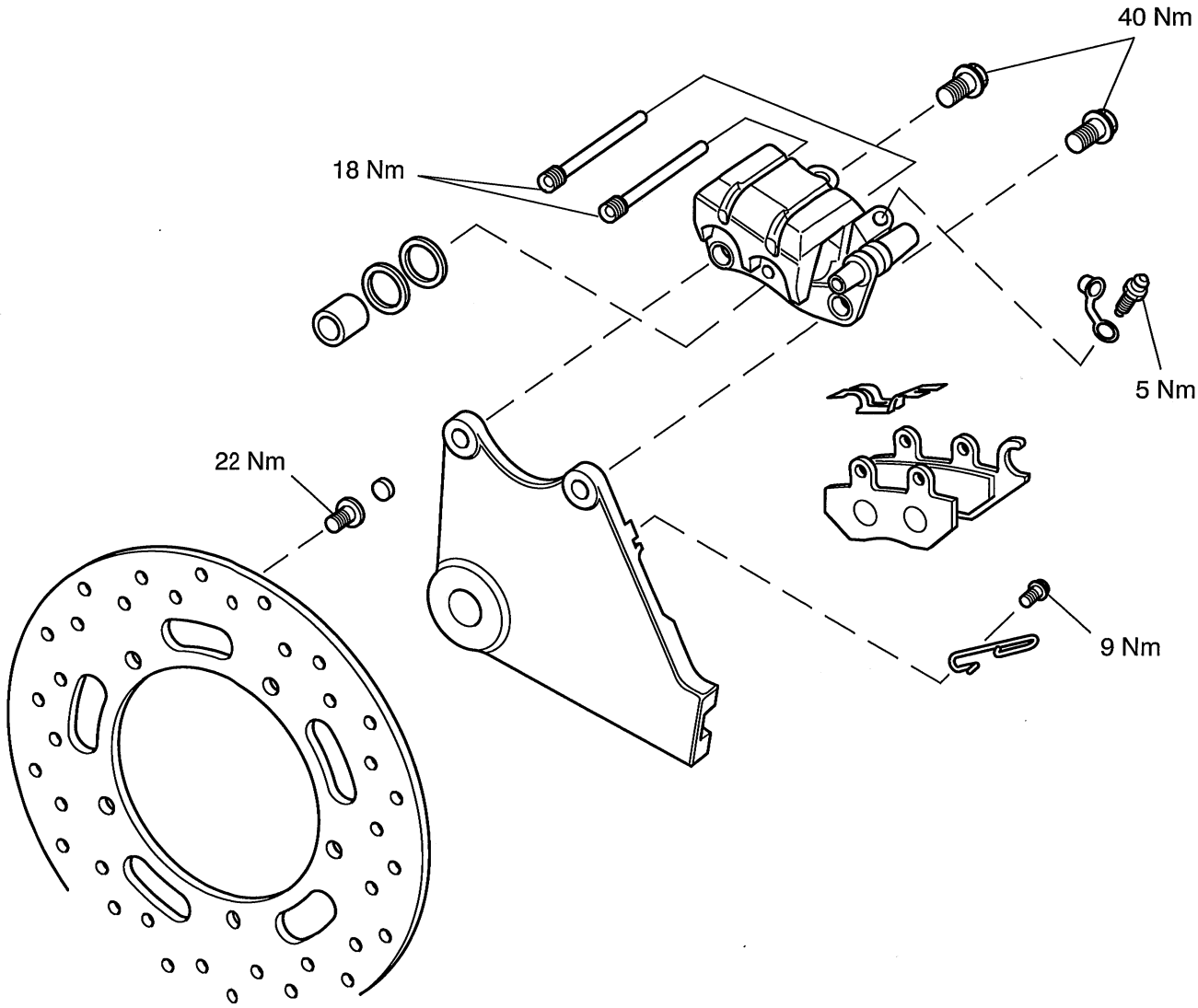




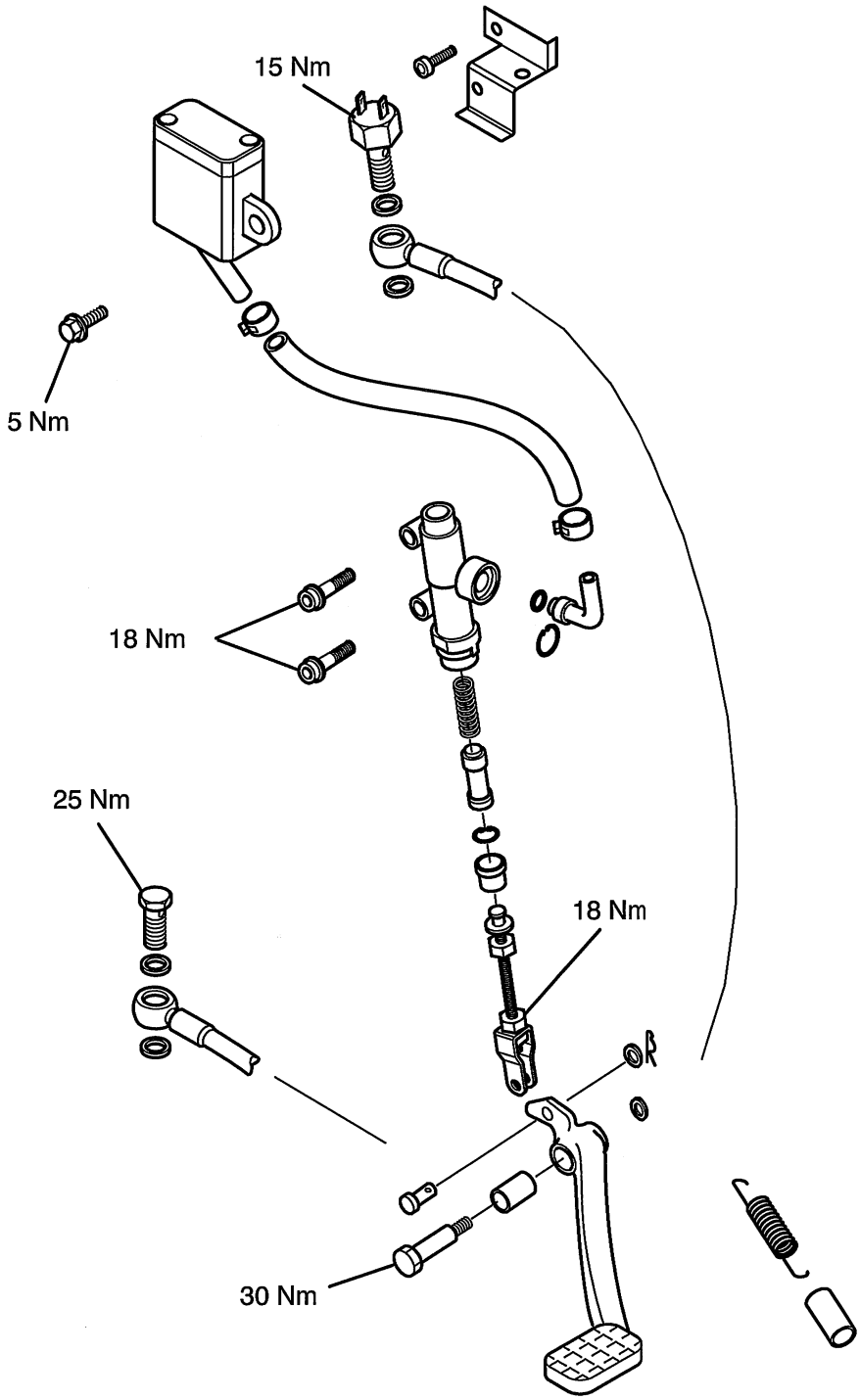
Exploded View
Rear Brake Caliper and Disc - Bonneville, Bonneville T100, Scrambler & Thruxton



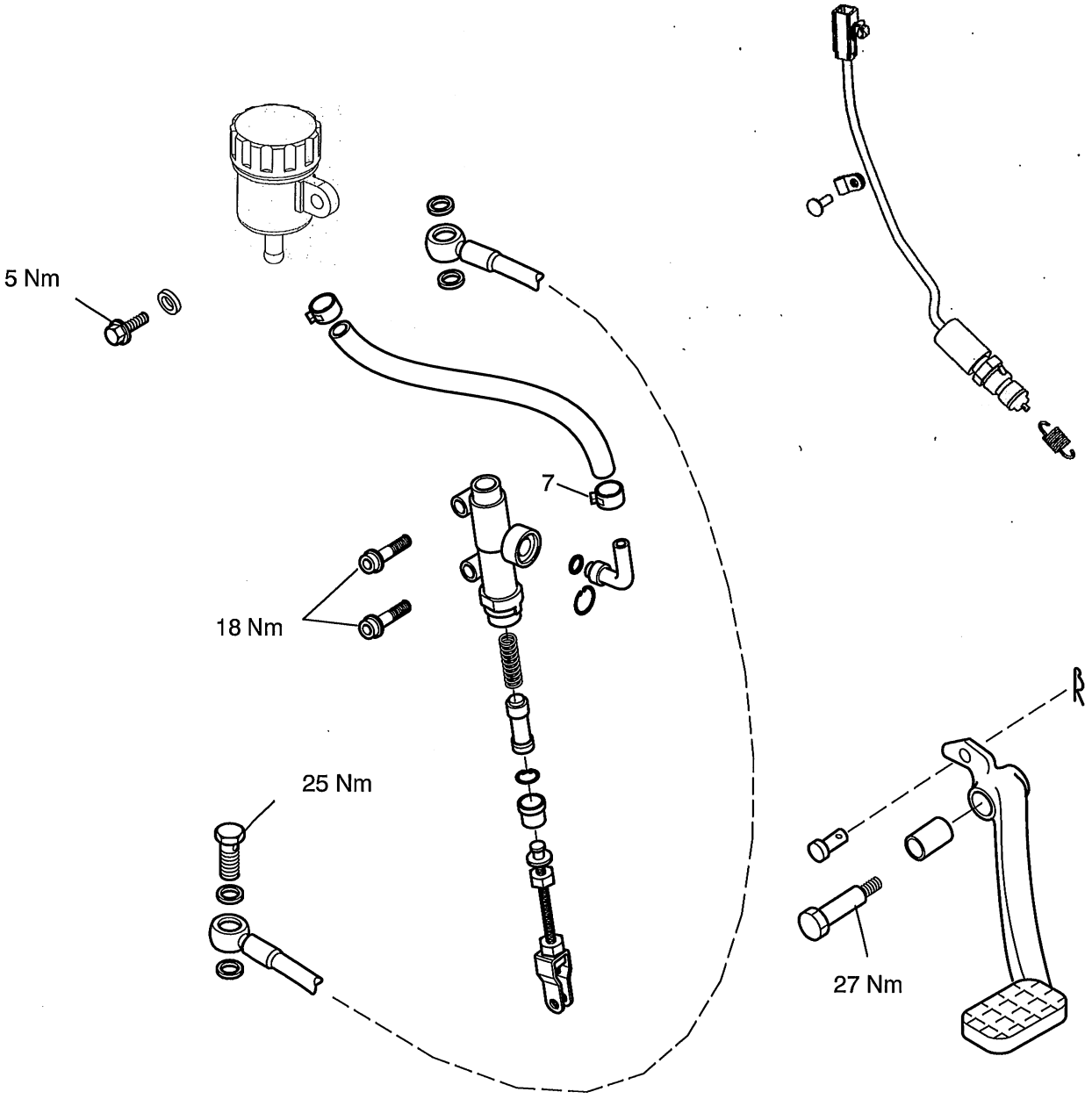
Exploded View
Rear Brake Caliper and Disc - America & Speedmaster



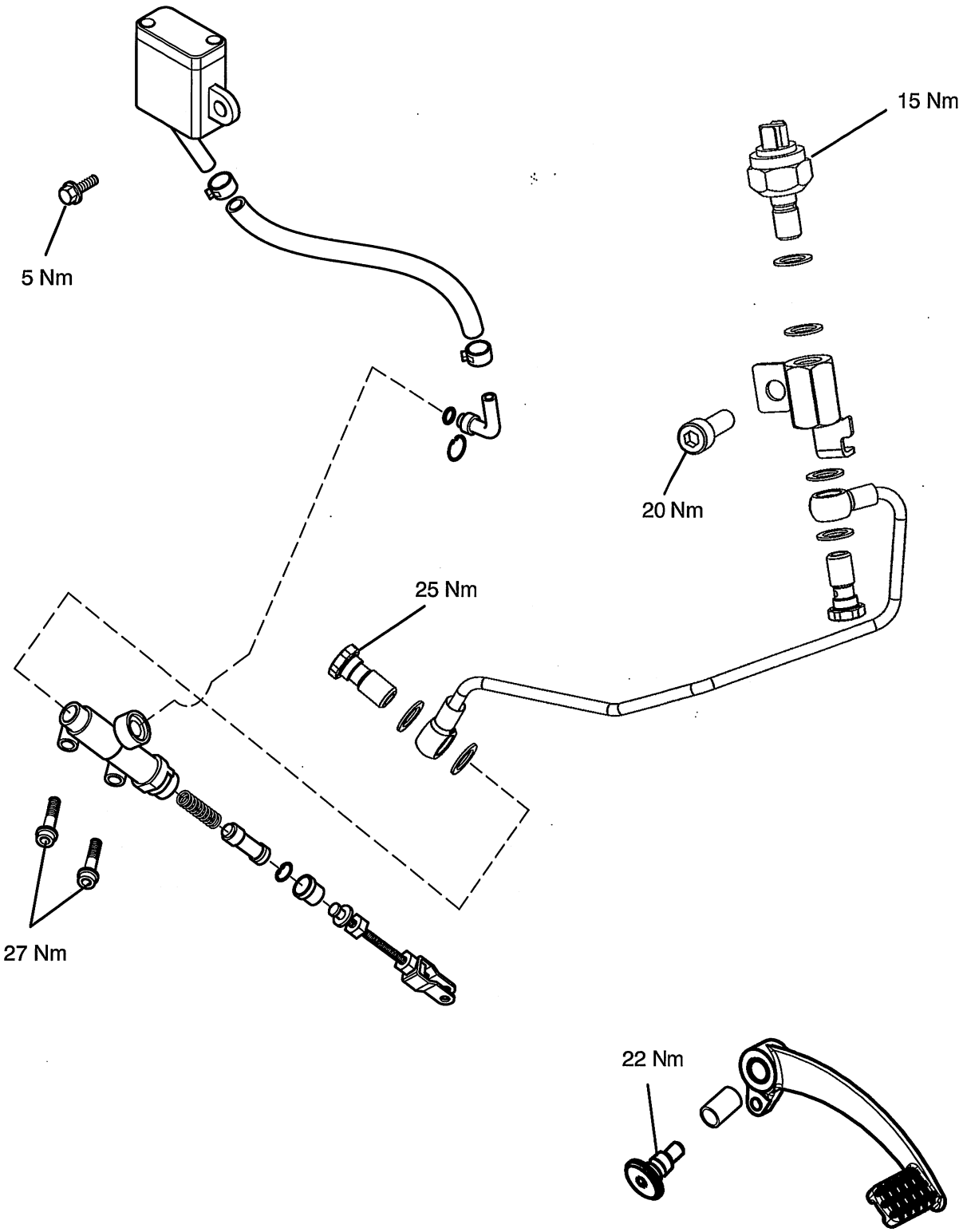
Exploded View
Rear Brake Master Cylinder and Hose - Bonneville & Bonneville T100



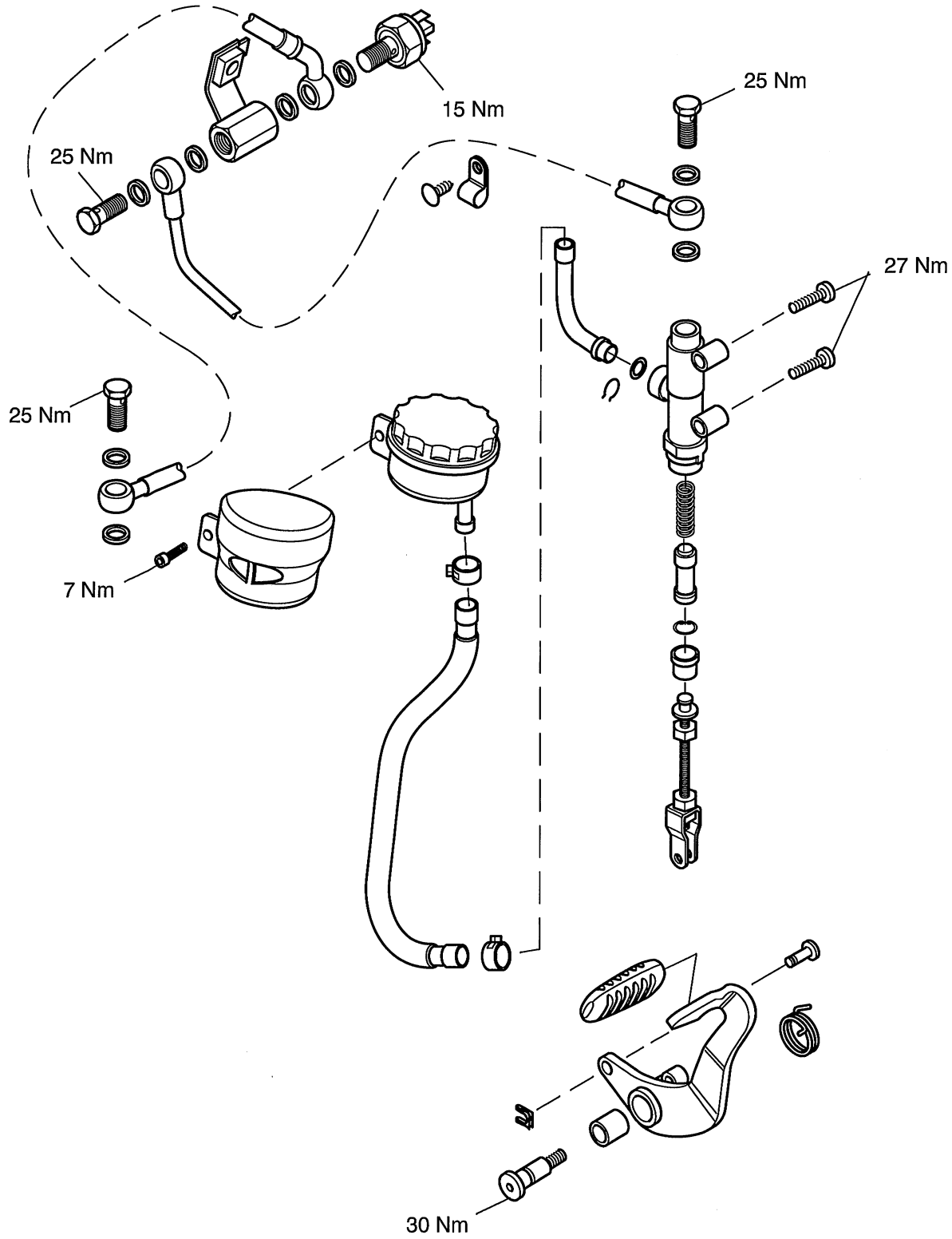
Exploded View
Rear Brake Master Cylinder and Hose - Scrambler



Exploded View
Rear Brake Master Cylinder and Hose - Thruxton



Exploded View
Rear Brake Master Cylinder and Hose - America & Speedmaster



BRAKING SYSTEM SAFETY PRECAUTIONS

WARNING: FAILURE TO OBSERVE ANY OF THE FOLLOWING WARNINGS WILL LEAD TO A REDUCTION IN BRAKING EFFICIENCY WHICH COULD RESULT IN AN ACCIDENT.

WARNING: Use only DOT 4 specification brake fluid in the front and rear brakes. When adding fluid, always use new brake fluid from a sealed container and ensure absolute cleanliness. Never use fluid from an unsealed container.

WARNING: Brake fluid is hygroscopic which means it will absorb moisture from the air. The absorbed moisture will greatly reduce the boiling point of the brake fluid causing a reduction in braking efficiency. Because of this it is essential that the brake fluid is renewed at the specified intervals (see maintenance schedule).

WARNING: Regularly check the fluid levels in both reservoirs. If the fluid level is noted to have dropped rapidly, carry out a thorough leak check of all components (the fluid level will drop slowly as the pads wear but should never decrease suddenly). Rectify any problems before riding the motorcycle.

WARNING: If it is noted that the brake lever or pedal feel soft when applied, or the lever/pedal travel has become excessive, there may be air in the brake lines. Bleed the brake to remove the trapped air. If this fails to improve the situation, overhaul the master cylinder/brake caliper.

WARNING: Never use mineral based grease in any part of the braking system or in any area where contact with the braking system is possible. Mineral based grease will damage the hydraulic seals in the calipers and master cylinders.

CAUTION: Do not spill brake fluid onto any area of the bodywork as this will damage any painted or plastic surface. In the event of a spill, wipe off the brake fluid immediately and wash the affected area with plenty of water to prevent cosmetic damage.

BRAKE FLUID LEVEL CHECK

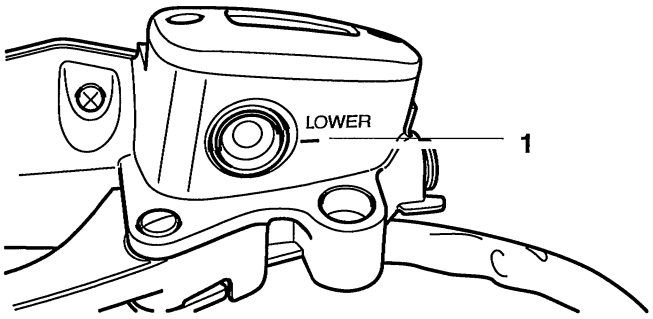
NOTE:

- **Read through the safety precautions before proceeding.**
- **When checking or adjusting the brake fluid level, always keep the reservoir level and upright.**

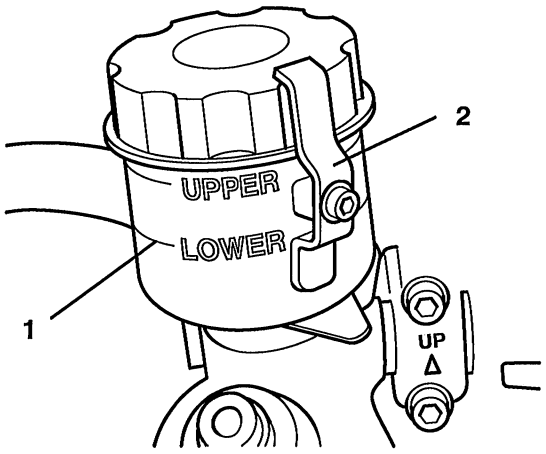
Front brake

1. With the reservoir level and upright, check the level of brake fluid visible at the front of the reservoir body. The fluid level must be kept above the lower level mark.

WARNING: Never ride the motorcycle if the fluid level is below the lower level mark. If the fluid level is incorrect, braking efficiency will be adversely affected which could result in an accident.



1. Lower level mark - all except Thruxton & Scrambler



12.07-1

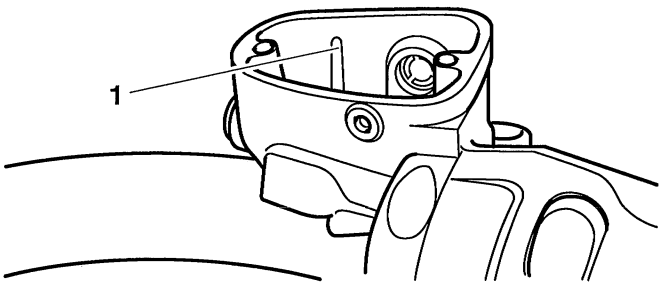
1. Lower level mark - Thruxton & Scrambler

2. Security clip

2. To adjust the fluid level, remove the reservoir cover (Thruxton only, remove the security clip from the reservoir).

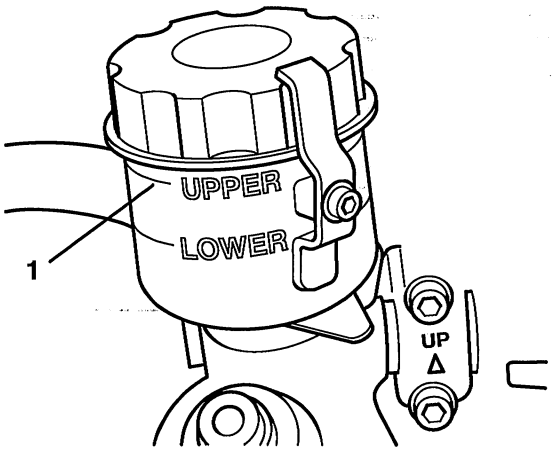
3. Remove the rubber diaphragm from the reservoir, taking care not to spill any fluid.

4. Top-up the fluid level to the upper level mark using only new DOT 4 fluid from a sealed container.



T908040

1. Upper level mark - all except Thruxton & Scrambler



12.07-1

1. Upper level mark - Thruxton & Scrambler

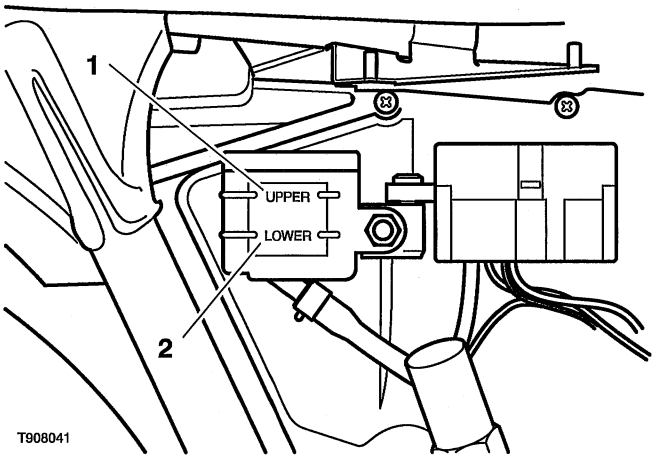
5. Once the fluid level is correct, wipe clean the rubber diaphragm and seat it in correctly in the top of the reservoir. Fit the cap to the reservoir (Thruxton and Scrambler only, refit the security clip).

Rear brake - Bonneville, Bonneville T100 & Thruxton

1. Remove the right-hand side cover.

2. With the reservoir level, check the brake fluid level. The fluid level must be kept between the upper and lower level marks.

WARNING: Never ride the motorcycle if the fluid level is above the upper level mark or below the lower level mark. If the fluid level is incorrect, braking efficiency will be adversely affected which could result in an accident.



1. Upper level mark

2. Lower level mark

3. To adjust the fluid level, remove the reservoir mounting screw and free the reservoir from the airbox. Undo the screws then lift off the reservoir cover and remove the rubber diaphragm, taking care not to spill any fluid.

4. Top-up the fluid level using only new DOT 4 fluid from a sealed container.

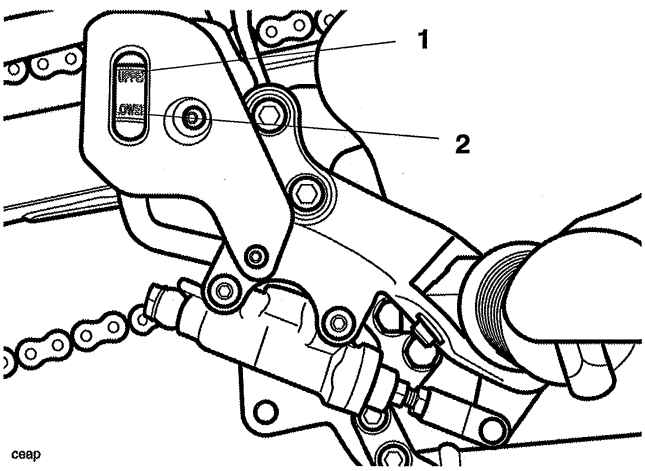
5. Once the fluid level is correct, wipe clean the rubber diaphragm and seat it in correctly in the top of the reservoir. Fit the cap to the reservoir, tightening the retaining screws securely, then refit the reservoir mounting screw and tighten to **7 Nm.**

6. Refit the side cover.

Rear brake - Scrambler

1. With the reservoir level, check the brake fluid level. The fluid level must be kept between the upper and lower level marks.

WARNING: Never ride the motorcycle if the fluid level is above the upper level mark or below the lower level mark. If the fluid level is incorrect, braking efficiency will be adversely affected which could result in an accident.



1. Upper level mark

2. Lower level mark

3. To adjust the fluid level, remove the screws securing the reservoir cover to the frame. Remove the cover, the reservoir cap and the rubber diaphragm, taking care not to spill any fluid.

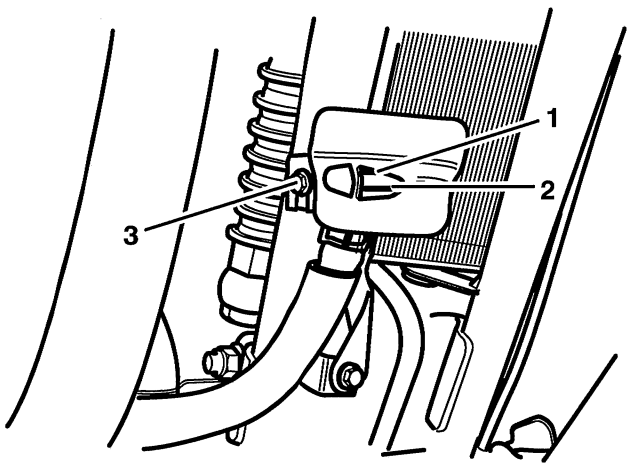
4. Top-up the fluid level using only new DOT 4 fluid from a sealed container.

5. Once the fluid level is correct, wipe clean the rubber diaphragm and seat it in correctly in the top of the reservoir. Fit the cap to the reservoir, then refit the reservoir cover to the frame tightening the screws to **3 Nm.**

Rear brake - America & Speedmaster

1. With the reservoir level, check the brake fluid level. The fluid level must be kept between the upper and lower level marks.

WARNING: Never ride the motorcycle if the fluid level is above the upper level mark or below the lower level mark. If the fluid level is incorrect, braking efficiency will be adversely affected which could result in an accident.



1. Upper level mark

2. Lower level mark

3. Reservoir fixing

2. To adjust the fluid level, remove the reservoir mounting screw and free the reservoir from the mounting bracket.

3. Detach the reservoir cover.

4. Keeping the reservoir upright, remove the cap and diaphragm, taking care not to spill any fluid.

5. Top-up the fluid level using only new DOT 4 fluid from a sealed container.

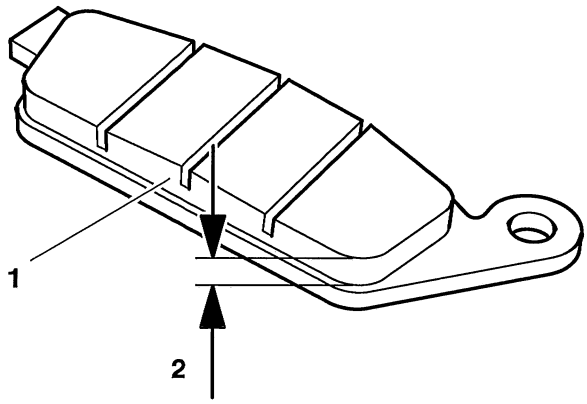
6. Once the fluid level is correct, wipe clean the rubber diaphragm and seat it in correctly in the top of the reservoir.

7. Securely refit the reservoir cap and then refit the reservoir cover.

8. Locate the reservoir to the mounting bracket and secure it with the screw tightening it to **7 Nm.**

BRAKE PAD WEAR CHECK

1. Carry out a visual inspection of the front and rear brake pad friction material thickness. The minimum thickness of lining material for any brake pad is 1.5 mm.



T908039

1. Brake pad

2. Friction material thickness (service limit 1.5 mm)

2. If any pad is worn beyond the specified limit, renew the pads as a set.

BRAKE BLEEDING AND FLUID RENEWAL

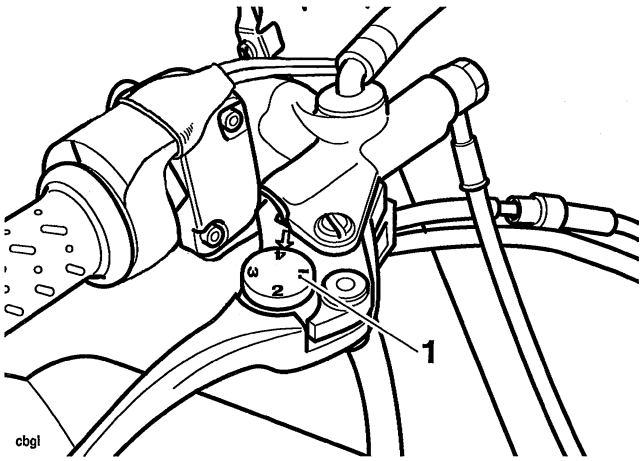
Front brake bleeding

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

NOTE:

- **Read through the safety precautions before proceeding.**

1. On models fitted with an adjustable brake lever, note the original setting of the brake lever adjuster in order that it can be returned to the same position when the bleeding operation is complete. Set the brake lever adjuster to position No.1.



1. Adjuster (Thruxton shown)

2. Turn the handlebars to bring the brake fluid reservoir to a level position.

3. Remove the cap and rubber diaphragm from the reservoir, taking care not to spill any fluid.

4. Remove the cap and rubber diaphragm from the reservoir, taking care not to spill any fluid.

5. Top the fluid level up to the upper level mark using new DOT 4 fluid.

WARNING: Ensure absolute cleanliness when adding brake fluid to the brake fluid reservoir. Do not allow moisture or debris to enter the cylinder as this will adversely affect the fluid properties. Always use fluid from a sealed container and do not use fluid from a container which has been previously opened.

Always check for fluid leakage around hydraulic fittings and for damage to hoses. Rectify faults as necessary before riding.

A dangerous riding condition leading to an accident could result if this warning is ignored.

CAUTION: To prevent body damage, do not spill brake fluid onto any area of the bodywork.

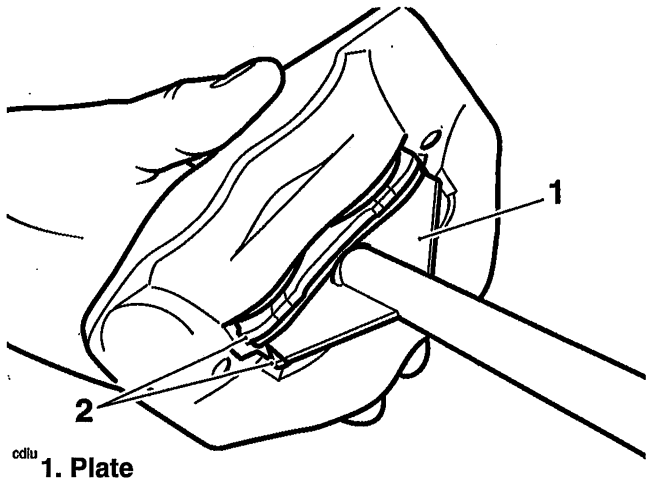
NOTE:

- **Ensure the fluid level is kept above the lower level mark at all times during bleeding. If the level is allowed to fall below the lower mark, air may enter the system and the bleeding operation will have to be restarted.**

6. Undo and remove the bolts securing the front brake caliper to the fork and manoeuvre the caliper clear of the brake disc. **Do not remove the brake hose connected to the caliper..**

WARNING: Do not allow the caliper to hang on the brake hose as this may damage the hose and could lead to an accident.

7. Obtain a suitable, wide, flat metal plate which is approximately 2 mm thick and place it between the brake pads. Pump the front brake lever a few times until the metal plate is held in place by the brake pads.



1. Plate

2. Brake pads

8. Remove the rubber cap from the bleed nipple on the caliper.

9. Whilst supporting the front brake caliper, attach a transparent tube to the bleed nipple and place the other end of the tube in a suitable receptacle containing new brake fluid. Keep the tube end below the level of fluid.

10. Support the caliper so that the bleed nipple is uppermost then release the bleed nipple.

NOTE:

- **During bleeding, do not allow the fluid level to fall below the lower level mark in the reservoir. If the level is allowed to fall below this mark, air may enter the system and the sequence of bleeding must be repeated.**

11. Get an assistant to slowly pull the brake lever to the handlebar.

12. With the lever held fully against the handlebar, close the bleed nipple. Once the bleed nipple is closed, release the brake lever.

13. Repeat steps 10 to12 until no more air appears in the bleed tube.

14. When all the air has been expelled from the system, hold the brake lever in and close the bleed nipple.

15. Remove the transparent bleed tube.

16. Using the flat metal plate, gently push the brake pads apart to allow clearance for the brake disc when the caliper is refitted.

WARNING: Brake fluid may be displaced as the caliper pistons are compressed. To prevent bodywork damage, ensure that the displaced fluid does not come into contact with any part of the bodywork or the wheel.

17. Secure the caliper to the front fork using the original fixings. Tighten the fixings to **28 Nm.**.

18. Refit the transparent bleed tube and repeat steps10 to 12 until no more air appears in the bleed tube.

NOTE:

- **Maintain the brake fluid level between the upper and lower reservoir levels whilst bleeding is being carried out.**

19. Remove the transparent bleed tube and tighten the bleed nipple to **5 Nm** then refit the rubber cap.

20. Fill the reservoir to the upper level with new DOT 4 fluid.

WARNING: Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

21. Repeat the brake bleeding procedure for the remaining front caliper (if fitted).

22. Wipe clean the rubber diaphragm and seat it correctly in the top of the reservoir. Refit the reservoir cap.

23. On models fitted with an adjustable brake lever, reset the brake lever adjuster to the original setting.

24. Check that the brake operates correctly.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

NOTE:

- **If extensive bleeding fails to improve the feel of the brake lever, it is likely that the master cylinder seals are worn.**

Rear brake bleeding

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

NOTE:

- **Refer to the safety precautions before proceeding.**

1. Remove the right-hand side cover (Bonneville, Bonneville T100 & Thruxton only).

2. Remove the reservoir mounting screw and free the reservoir from the airbox (Bonneville, Bonneville T100 & Thruxton only). On America and Speedmaster, release the reservoir from its mounting bracket and remove the reservoir cover. On Scrambler, it is not neccessary to remove the rear brake fluid reservoir to bleed the brakes.

3. Whilst ensuring that the reservoir remains upright, remove the reservoir cover and diaphragm, taking care not to spill any fluid.

4. On Scrambler, remove the screws securing the reservoir cover to the frame. Remove the cover, the reservoir cap and the rubber diaphragm, taking care not to spill any fluid.

5. Remove the dust cap from the rear brake caliper bleed nipple.

6. Attach a transparent tube to the bleed nipple.

7. Place the other end of the tube in a container partially filled with new brake fluid. Keep the tube end below the level of fluid.

8. Position the fluid reservoir so that it is level then top the fluid level up to the upper level mark using new DOT 4 fluid.

WARNING: Ensure absolute cleanliness when adding brake fluid to the brake fluid reservoir. Do not allow moisture or debris to enter the cylinder as this will adversely affect the fluid properties. Always use fluid from a sealed container and do not use fluid from a container which has been previously opened.

Always check for fluid leakage around hydraulic fittings and for damage to hoses. Rectify faults as necessary before riding.

A dangerous riding condition leading to an accident could result if this warning is ignored.

CAUTION: To prevent body damage, do not spill brake fluid onto any area of the bodywork.

NOTE:

- **Ensure the fluid level is kept above the lower level mark at all times during bleeding. If the level is allowed to fall below the lower mark, air may enter the system and the bleeding operation will have to be restarted.**

9. Hold the brake pedal gently down then loosen the bleed nipple until fluid is expelled from the nipple.

10. Slowly pump the brake pedal a few times then hold it down and tighten the bleed nipple.

11. Repeat steps 9 and 10 until no more air is visible in the fluid exiting the bleed nipple.

12. Check the operation of the brake pedal. If the pedal feels soft, or there is excessive lever travel before the brake is applied, there is still air in the system. Repeat the bleeding procedure.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

NOTE:

- **If extensive bleeding fails to improve the feel of the brake pedal, it is likely that the master cylinder seals are worn.**

13. When the brake operation is correct, disconnect the tube. Tighten the bleed nipple to **5 Nm** and refit the dust cap.

14. Fill the reservoir to the upper level with new DOT 4 fluid.

WARNING: Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

15. Wipe clean the rubber diaphragm and seat it correctly in the top of the reservoir.

16. Fit the cap to the reservoir and securely tighten (on Bonneville & Bonneville T100, tighten the cap retaining screws).

17. On America, Scrambler and Speedmaster, refit the reservoir cover.

18. On America and Speedmaster, refit the reservoir to the mounting bracket and secure with the mounting screw. Tighten the screw to **7 Nm.**.

19. Refit the side cover (Bonneville, Bonneville T100 & Thruxton only).

Brake fluid renewal (front or rear brake)

1. The brake fluid must be regularly renewed (see maintenance schedule) to ensure safe braking.

2. Brake fluid renewal is essentially the same as bleeding. Prior to starting the procedure, empty the fluid reservoir and fill with new fluid. Repeat the bleeding process until new (clean) fluid is seen to be exiting the bleed nipple.

FRONT BRAKE PADS

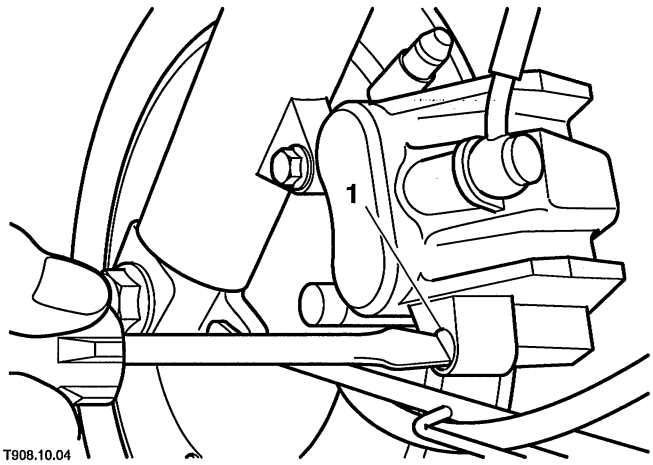
NOTE:

- **Read through the safety precautions before proceeding.**
- **If two calipers are fitted, replace both pads in the first caliper before replacing both pads in the second caliper.**

Removal

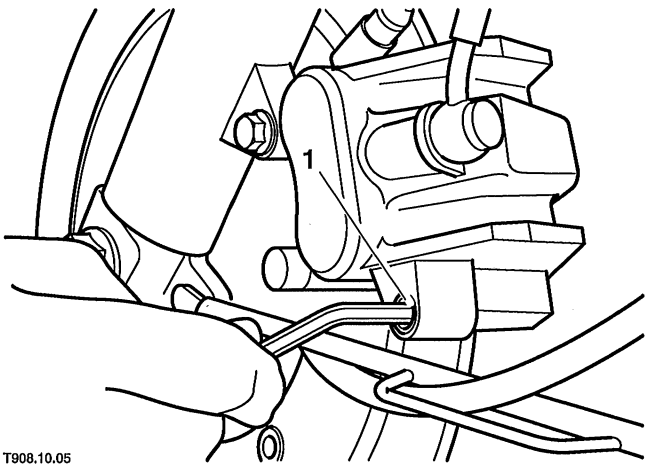
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Unscrew the pad retaining pin plug from the caliper.



1. Pad retaining pin plug

2. Loosen the pad retaining pin.



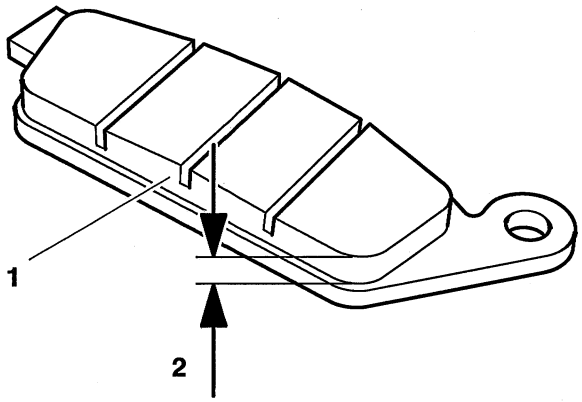
1. Pad retaining pin

3. Slacken and remove the caliper mounting bolts and slide the caliper off the disc.

4. Remove the pad retaining pin and remove the pads from the caliper. Take care not to lose the pad retainer from the mounting bracket or the anti-rattle spring from the caliper body.

Inspection

1. Check the friction material of each pad for signs of contamination and measure its thickness. If the friction material of either pad is contaminated or has worn beyond the service limit, renew both pads as a set.



T908039

1. Brake pad

2. Friction material thickness (service limit 1.5 mm)

2. Check the pad retainer, anti-rattle spring and retaining pin. Renew any component which shows signs of damage or corrosion.

3. Check the caliper body slides easily on the mounting bracket pins and check there is no sign of leakage from the piston seals. Rectify any problems before installing the pads.

Installation

1. If new pads are being installed, push the pistons fully back into the caliper body. Keep an eye on the fluid level in the reservoir whilst retracting the pistons to prevent fluid spillage.

2. Ensure the pad retainer is correctly fitted to the mounting bracket and the anti-rattle spring is securely clipped onto the caliper body.

3. Lubricate the pad retaining pin with a thin smear of proprietary high-temperature brake grease.

WARNING: Do not apply more than a minimum coating of grease to the pad retaining pin. Excess grease may contaminate the brake pads, hydraulic seals and disc causing reduced braking efficiency which may lead to loss of control and an accident.

4. Fit the pads to the caliper with their friction material surfaces facing each other. Locate the pad upper ends in the mounting bracket retainer then align them with the caliper body and insert the retaining pin.

5. Slide the caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **28 Nm**.

6. Tighten the pad retaining pin to **18 Nm**.

7. Fit the pad retaining pin plug to the caliper and tighten to **3 Nm**.

8. Apply the front brake lever several times to force the pads back into contact with the disc.

NOTE:

- **If two calipers are fitted, repeat the removal, inspection and installation process for the other caliper.**

9. Check the front brake fluid level, adjust as necessary.

FRONT BRAKE CALIPER

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

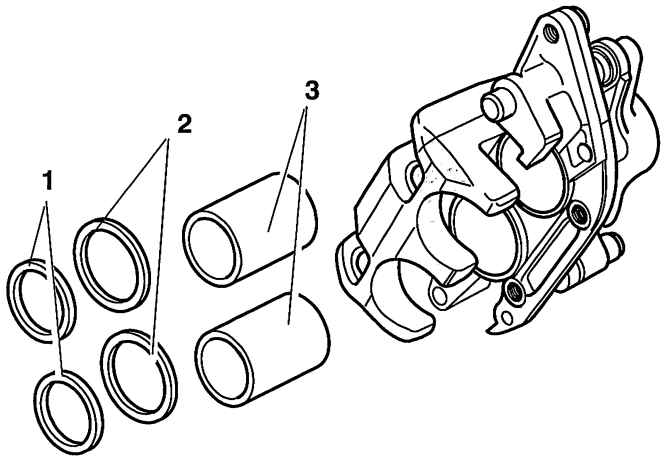
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Unscrew the banjo bolt and disconnect the brake hose from the caliper. Place the hose end in a suitable container to collect brake fluid and discard the sealing washers.
2. If the caliper is to be overhauled, remove the brake pads and remove the caliper from the motorcycle.
3. If not, unscrew the mounting bolts and remove the caliper complete with pads.

Overhaul

1. Separate the caliper and mounting bracket.
2. Cover the caliper opening with a clean, heavy cloth and, using either compressed air or by reconnecting the master cylinder and pumping the brake lever, eject both pistons from the caliper at the same time.

WARNING: To prevent injury, never place fingers or hands inside the caliper opening when removing the pistons. Always wear eye, hand and face protection when using compressed air. Eye, face and skin damage will result from direct contact with compressed air.



1. Dust seals

2. Piston seals

3. Pistons

3. Extract the dust seals and piston seals, taking care not to damage the caliper bores.
4. Check the pistons, caliper and mounting bracket for signs of damage, paying particular attention to the caliper bores and pistons. If damage is present, renew the worn component or the complete caliper assembly.
5. If all components are serviceable, obtain a piston seal kit and reassemble the caliper as follows.

WARNING: Always renew caliper seals after removal of the pistons. An effective hydraulic seal can only be made if new seals are fitted.

A dangerous riding condition leading to an accident could result if this warning is ignored.

6. Ensure all components are clean and dry, then fit the **new** seals to their grooves in the caliper bores.

7. Lubricate the fluid seals, caliper bore and the outside of the pistons with clean DOT 4 brake fluid.

8. Ease the pistons squarely back into the bores, taking care not to displace the seals.

9. Lubricate the mounting bracket pins with lithium-based grease then reassemble the bracket and caliper. Ensure the pin gaiters are correctly located on both the bracket and caliper.

Installation

1. If the caliper has been overhauled, install the brake pads.

2. Slide the caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **28 Nm.**

3. Position a **new** sealing washer on each side of the brake hose end fitting then secure the hose to the caliper with the banjo bolt. Tighten the banjo bolt to **25 Nm.**

4. Bleed the front brake.

5. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

FRONT BRAKE MASTER CYLINDER - ALL MODELS EXCEPT THRUXTON & SCRAMBLER

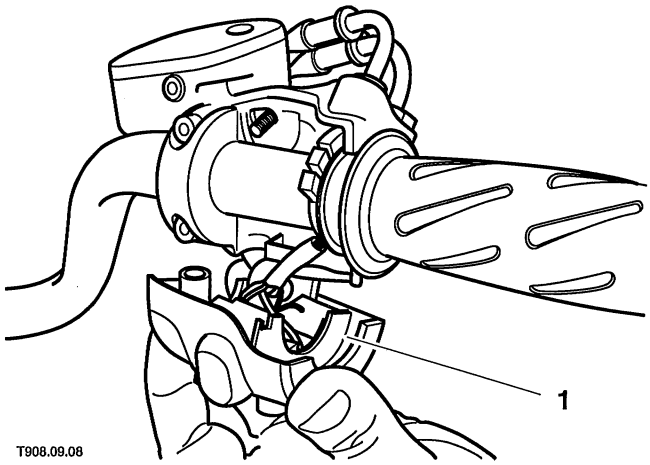
NOTE:

- **Read through the safety precautions before proceeding.**

Removal

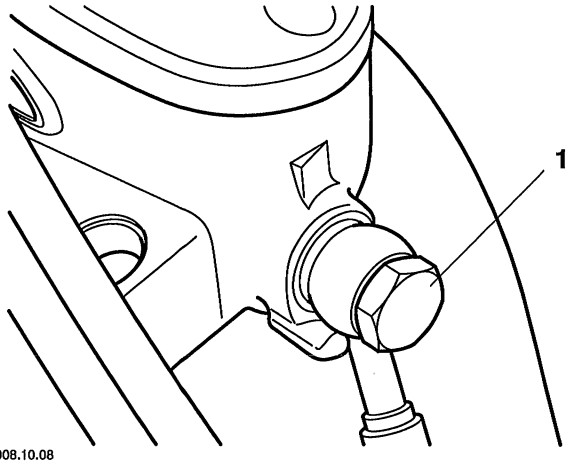
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the mirror.
2. Undo the screws and free the right-hand switchgear assembly from the master cylinder.



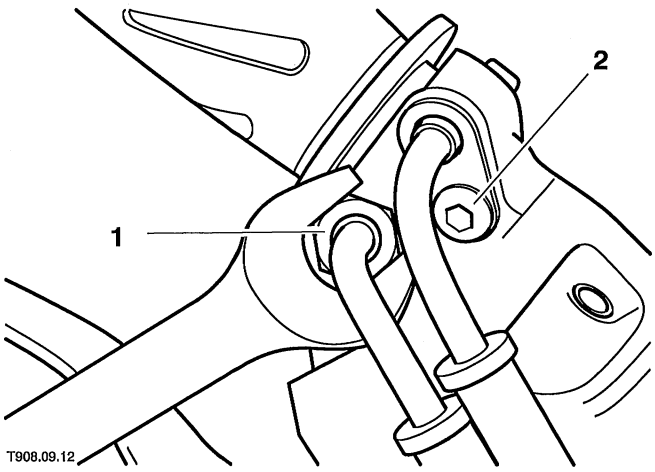
1. Right-hand switchgear assembly

3. Disconnect the wiring from the front brake light switch.
4. Position a cloth beneath the hose to catch any spilt fluid then unscrew the banjo bolt and disconnect the brake hose from the master cylinder. Discard the sealing washers and keep the hose upright to minimise fluid loss.



1. Banjo bolt

5. Slacken the reservoir cover screws.
6. Slacken the nut and screw securing the throttle cables to the master cylinder.



1. Closing cable nut

2. Opening cable screw

7. Undo the screws and remove the master cylinder mounting clamp.

8. Free the throttle cables from the twistgrip and free the master cylinder from the handlebars.

NOTE:

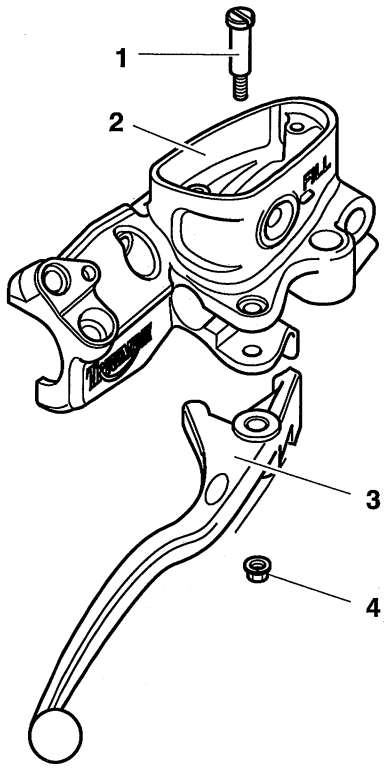
- **Keep the master cylinder upright to prevent fluid spillage.**
- **If necessary, free the throttle cables from the carburettor bracket to gain the necessary freeplay to allow them to be disconnected from the twistgrip.**

9. Remove the screw and slacken the nut then detach the throttle cables from the master cylinder.

10. Remove the master cylinder then lift off the reservoir cover and diaphragm and empty its contents into a suitable container.

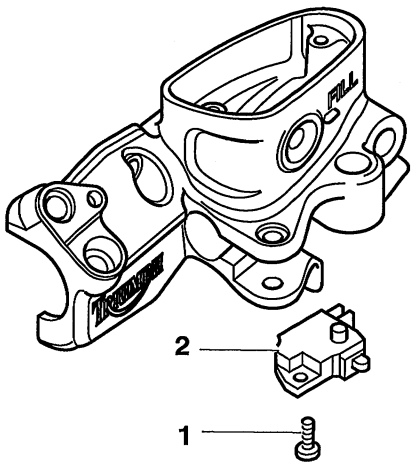
Overhaul

1. Unscrew the locknut then unscrew the pivot bolt and remove the brake lever.



1. Pivot bolt
2. Master cylinder
3. Brake lever
4. Locknut

2. Undo the screw and remove the brake light switch.



1. Screw
2. Brake light switch

3. Remove the boot from the end of the master cylinder bore.

4. Remove the circlip then withdraw the piston assembly and spring, noting the fitted position of all parts.

5. Check all components for signs of damage, paying particular attention to the cylinder bore and piston assembly. If the master cylinder bore is damaged, renew the complete assembly.

6. If the master cylinder is serviceable, obtain a new piston kit and reassemble as follows.

WARNING: Always renew the piston assembly every time it is removed. An effective hydraulic seal can only be made if a new assembly is fitted.

A dangerous riding condition leading to an accident could result if this warning is ignored.

7. Ensure all components are clean and dry.

8. Lubricate the **new** piston assembly and the cylinder bore with clean DOT 4 brake fluid.

9. Fit the **new** spring ensuring its tapered end is facing the piston assembly.

10. Ensure the piston assembly is the correct way around then ease it into the master cylinder with a twisting motion. Take great care not to displace the seals as they enter the bore.

11. Secure the piston assembly in position with the circlip, ensuring it is correctly located in the cylinder groove.

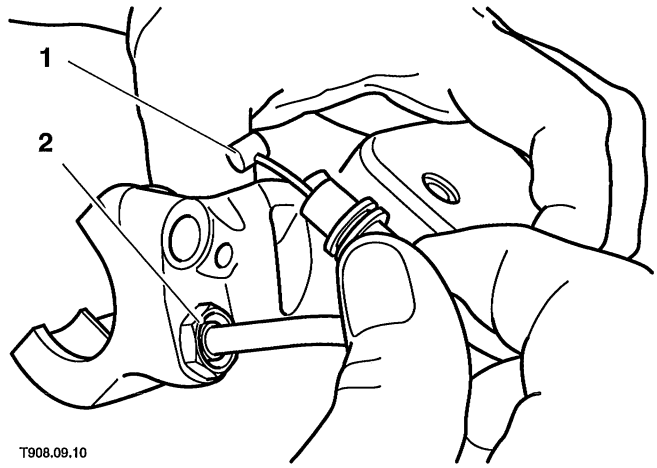
12. Lubricate the piston end with brake grease then fit the dust boot. Ensure the boot is correctly located in the cylinder bore and on the piston.

13. Refit the brake light switch.

14. Lubricate the brake lever pivot with brake grease and fit the lever. Insert the pivot bolt and tighten to **6 Nm** then fit the locknut to the bolt and tighten it to **6 Nm.**

Installation

1. Fit the throttle cables to the master cylinder, tightening the retaining screw/nut securely.

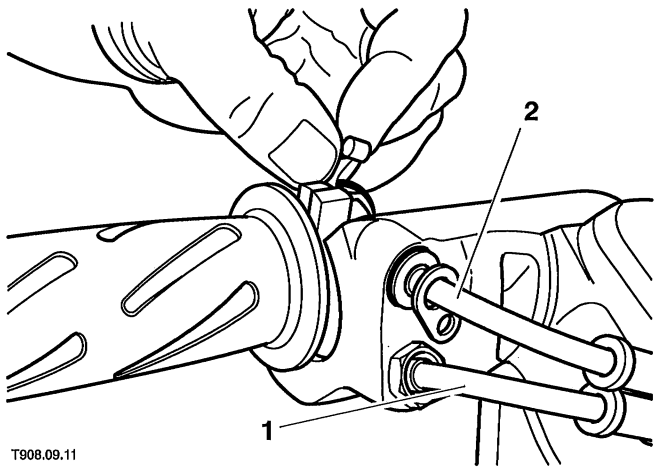


T908.09.10

1. Opening cable

2. Closing cable

2. Connect the cables to the twistgrip then seat the master cylinder on the handlebars.

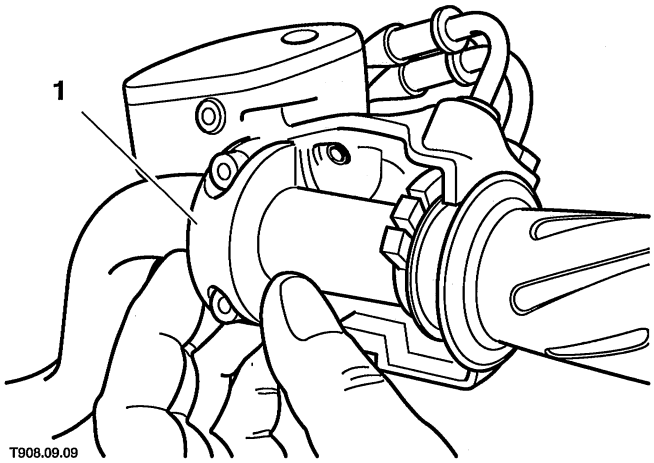


T908.09.11

1. Closing cable

2. Opening cable

3. Fit the mounting clamp and bolts. **America & Speedmaster** - align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**
Bonneville & Bonneville T100 - align the clamp upper split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**



1. Master cylinder mounting clamp

4. Refit the switchgear assembly to the master cylinder, tightening the screws to **6 Nm.**

NOTE:

- **On America & Speedmaster models, tuck the indicator wiring and connector into the recess in the front half of the switchgear.**

5. Position a **new** sealing washer on each side of the brake hose end fitting then secure the hose to the master cylinder with the banjo bolt. Tighten the banjo bolt to **25 Nm.**

6. Fill the reservoir with clean DOT 4 brake fluid then bleed the front brake.

7. Check the throttle cable operation and adjust the cable freeplay as described in section 9.

WARNING: Operation of the motorcycle with an incorrectly adjusted, incorrectly routed or damaged throttle cable could interfere with the operation of the brakes, clutch or the throttle itself. Any of these conditions could result in loss of control of the motorcycle and an accident.

WARNING: Move the handlebars to left and right full lock while checking that cables and harnesses do not bind. A cable or harness which binds will restrict the steering and may cause loss of control and an accident.

8. Install the rear view mirror tightening its screw to **10 Nm.**

9. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

FRONT BRAKE MASTER CYLINDER - THRUXTON & SCRAMBLER ONLY

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

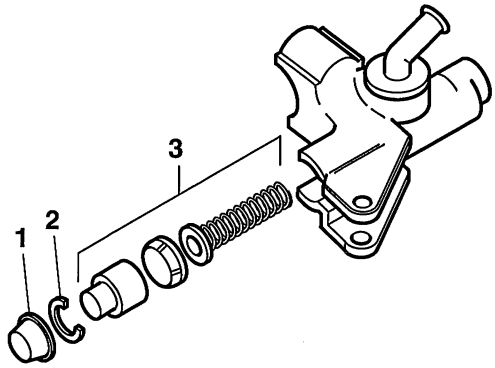
1. Remove the mirror.

CAUTION: To prevent body/paint damage, do not spill brake fluid onto any area of the bodywork or other painted or plastic surface.

2. To drain the fluid from the master cylinder, attach a tube to the caliper bleed nipple, slacken the nipple and allow the fluid to drain into a suitable container. Operate the brake lever until all fluid has been expelled.
3. Note the setting of the brake lever adjuster to ensure it is returned to the same position when the overhaul operation is complete.
4. Remove the pivot locknut and bolt securing the brake lever to the master cylinder. Remove the lever.
5. Disconnect from the master cylinder the;
   - brake hose,
   - brake light switch connections,
   - reservoir hose.
6. Release the clamp screws from the handlebar and collect the master cylinder.

Disassembly

1. Detach the boot from the lever end of the cylinder.
2. Remove the circlip from beneath the boot.
3. Remove the piston set from the master cylinder bore noting the relative position of the seals and piston components.



12.14-1

1. Boot

2. Circlip

3. Piston set

Inspection

1. Check the following for wear, damage, cracks or deterioration:
   - Cylinder bore.
   - Dust cover.
   - Spring.
   - Piston.
   - Pivot bolt.
2. Always renew the piston and seal set if the cylinder is dismantled.
3. Check that the relief and supply ports on the cylinder are not blocked.

Assembly

WARNING: Never use mineral based grease in any part of the braking system or in any area where contact with the braking system is possible. Mineral based grease will damage the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to an accident could result if this warning is ignored.

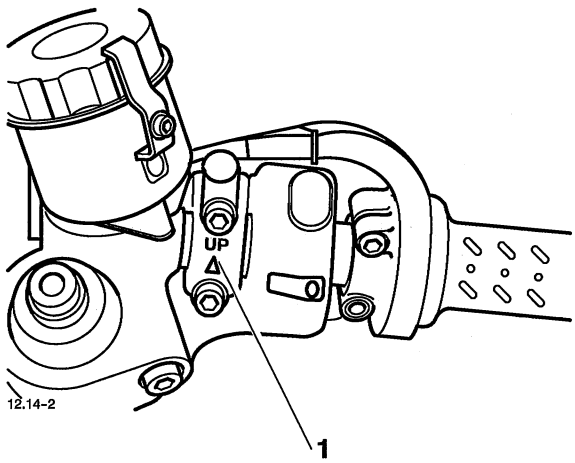
1. Lubricate the piston and cylinder with new, clean brake fluid.

WARNING: Ensure that the piston and piston seal are fitted facing the same way as noted during removal. A dangerous riding condition leading to an accident could result from incorrect assembly of the master cylinder.

2. Fit the new piston set into the master cylinder and retain with a new circlip.
3. Refit the master cylinder boot.

Installation

1. Locate the master cylinder to the handlebars and position the clamp with the 'UP' arrow pointing upwards. Align the master cylinder to clamp split line with the dot mark on the handlebar.



1. 'Up' arrow mark (Thruxton shown)

2. Tighten the clamp bolts, upper first and then the lower to **15 Nm**.
3. Connect the brake light switch.
4. Position the brake lever ensuring that the pivot boss is correctly aligned to the push rod. Fit and tighten the pivot bolt to **6 Nm**, and the locknut to **1 Nm.**
5. Connect the brake hose to the master cylinder incorporating new sealing washers. Tighten the banjo bolt to **25 Nm.**

WARNING: To prevent brake fluid leaks from the reservoir hose, ensure the reservoir hose clip is correctly positioned over the joint with the master cylinder.

An incorrectly positioned hose clip could cause a brake fluid leak and impaired brake performance, resulting in loss of motorcycle control and an accident.

6. Reconnect the reservoir hose.
7. Fill the master cylinder reservoir with new DOT4 brake fluid.

WARNING: Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

8. Bleed the front brakes as described earlier in this section.

WARNING: Always return the lever adjuster to the original setting noted during removal. Operating the motorcycle with lever settings which are unfamiliar may lead to loss of control or an accident.

9. Refit the mirror.
10. Return the brake lever adjuster to the setting previously noted.
11. Examine the system for correct operation and fluid leaks. Rectify as necessary.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

FRONT BRAKE DISC

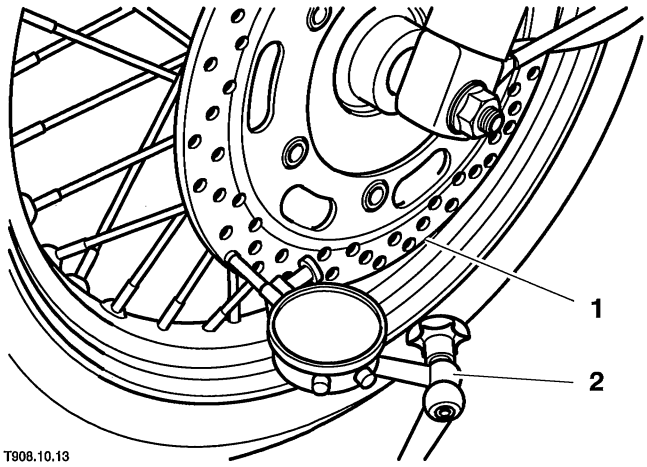
Inspection

NOTE:

- **If two front brake discs are fitted, always inspect both discs.**

1. Support the motorcycle on a stand so the front wheel is raised clear of the ground. Using a dial gauge, rotate the wheel and measure the disc runout.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.



T908.10.13

1. Brake disc

2. Dial gauge

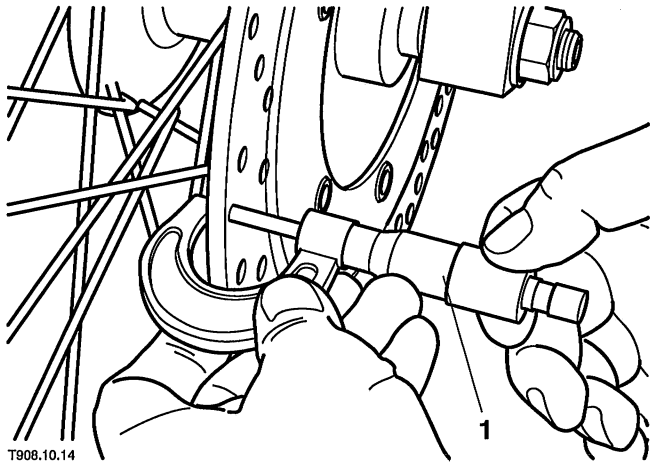
Disc run-out - all except Thruxton

Standard	**Less than 0.15 mm**
Service limit	**0.30 mm**

Disc run-out - Thruxton

Standard	**Less than 0.10 mm**
Service limit	**0.30 mm**

2. Using a micrometer, measure the disc thickness at several points.



T908.10.14

1. Micrometer

Disc thickness - all except Thruxton

Standard	**5.50 mm**
Service limit	**5.00 mm**

Disc thickness - Thruxton

Standard	**5.00 mm**
Service limit	**4.50 mm**

3. If the disc is warped or worn beyond the specified service limit, it must be renewed.

4. Repeat for the second disc (if applicable).

NOTE:

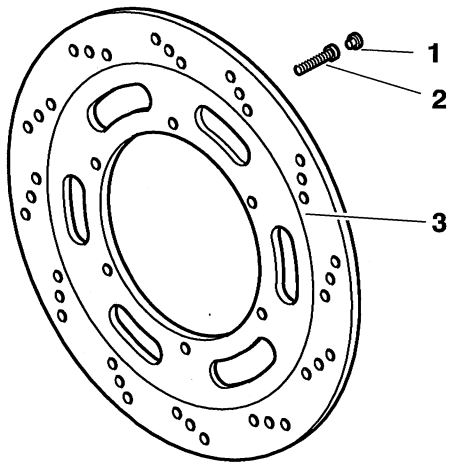
- **If two front brake discs are fitted, always replace both discs.**
- **Always replace all the front brake pads when replacing discs.**

Removal

1. Remove the front wheel as described in the wheel section.

> ⚠ **CAUTION: Never allow the weight of the wheel to rest on the disc as this could cause the disc to warp.**

2. Remove the trim caps from the disc retaining bolts.



1. Trim cap

2. Bolt

3. Disc

3. Evenly and progressively slacken the retaining bolts then remove the disc from the wheel. Discard the bolts.

4. Repeat for the second disc where fitted.

Installation

1. Ensure the disc and wheel surfaces are clean.

2. Fit the disc ensuring its marked surface is facing outwards.

3. Fit the **new** retaining bolts and tighten them evenly and progressively to **22 Nm**.

4. Fit a trim cap to each retaining bolt.

5. Repeat for the second disc where fitted.

6. Clean and degrease the disc(s) then refit the front wheel as described in the wheel section.

REAR BRAKE PADS

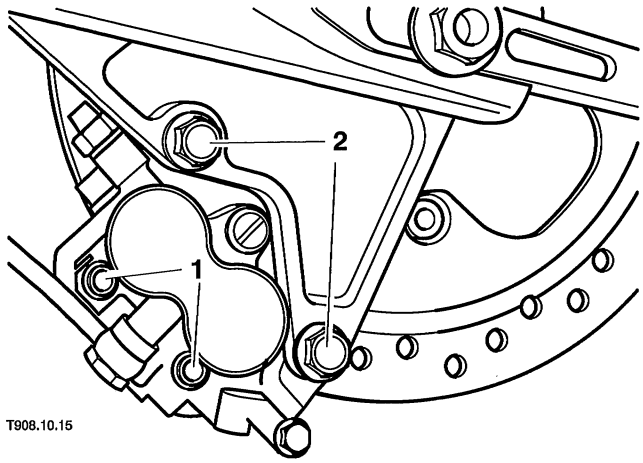
NOTE:

- **Read through the safety precautions before proceeding.**

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

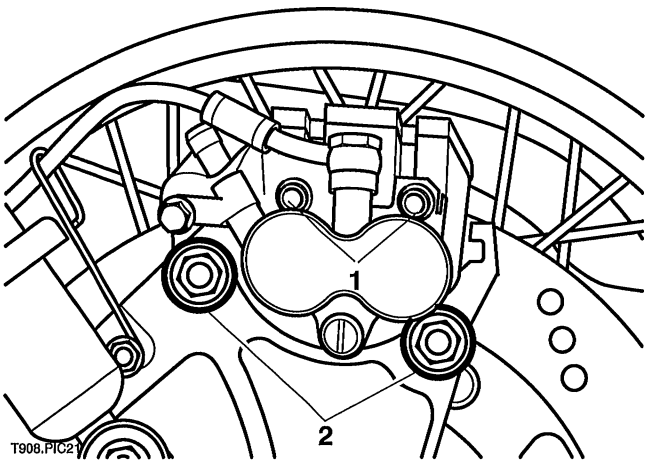
1. Remove the right-hand side cover to gain access to the rear brake fluid reservoir (Bonneville, Bonneville T100 & Thruxton only).
2. Loosen the pad retaining pins.



Bonneville, Bonneville T100, Scrambler & Thruxton

1. Pad retaining pins

2. Caliper mounting bolts



America & Speedmaster

1. Pad retaining pins

2. Caliper mounting bolts

3. Slacken and remove the caliper mounting bolts and slide the caliper off the disc.

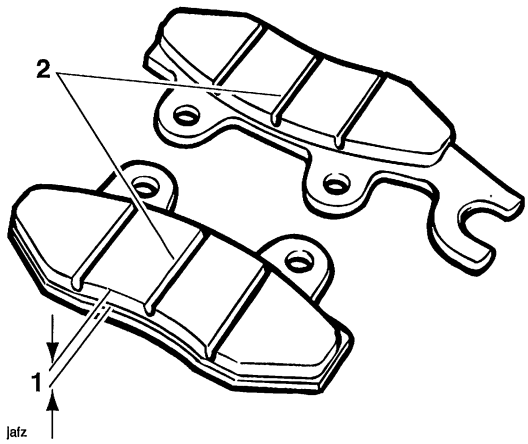
NOTE:

- **On America and Speedmaster models, release the clip securing the brake hose to the caliper carrier which will allow the caliper to be removed from the disc.**

4. Remove the pad retaining pins and withdraw the pads and anti-rattle spring from the caliper.

Inspection

1. Check the friction material of each pad for signs of contamination and measure its thickness. If the friction material of either pad is contaminated or has worn beyond the service limit, renew both pads as a set.



1. Friction material thickness (service limit 1.5 mm)

2. Brake pads

2. Check the anti-rattle spring and retaining pins. Renew any component which shows signs of damage or corrosion.
3. Check the caliper body slides easily on the mounting bracket pins and check there is no sign of leakage from the piston seals. Rectify any problems before installing the pads.

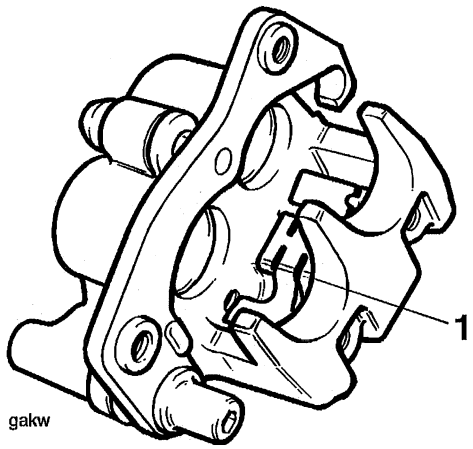
Installation

1. If new pads are being installed, push the pistons fully back into the caliper body. As the fluid level will rise when the pistons are retracted, keep an eye on the fluid level in the reservoir to prevent fluid spillage.

2. Lubricate the pad retaining pins with a thin smear of proprietary high-temperature brake grease.

WARNING: Do not apply more than a minimum coating of grease to the pad retaining pin. Excess grease may contaminate the brake pads, hydraulic seals and disc causing reduced braking efficiency which may lead to loss of control and an accident.

3. Fit the anti-rattle spring to the caliper.



1. Anti-rattle spring

4. Fit the pads to the caliper with their friction material surfaces facing each other. Ensure both pads are correctly located then align them with the caliper body and insert the retaining pins.

5. Slide the caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **40 Nm.**

6. Tighten the pad retaining pins to **18 Nm.**

7. On America and Speedmaster models, refit the hose clip to the caliper carrier, and tighten its fixing to **9 Nm.**

8. Apply the rear brake pedal several times to force the pads back into contact with the disc.

9. Check the rear brake fluid level and adjust if necessary.

10. Refit the side cover (Bonneville, Bonneville T100 & Thruxton only).

11. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

REAR BRAKE CALIPER

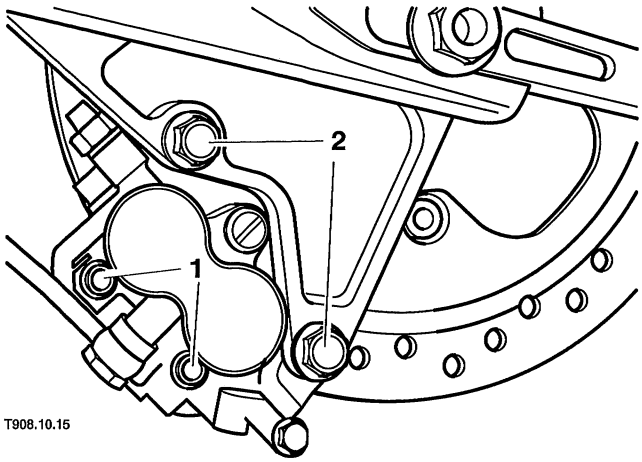
NOTE:

- **Read through the safety precautions before proceeding.**

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

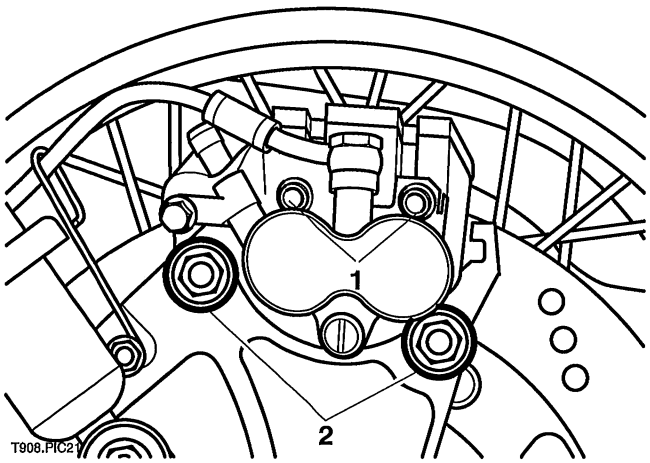
1. Unscrew the banjo bolt and disconnect the brake hose from the caliper. Place the hose end in a suitable container to collect brake fluid and discard the sealing washers.



Bonneville, Bonneville T100, Scrambler & Thruxton

1. Pad retaining pins

2. Caliper mounting bolts



America & Speedmaster

1. Pad retaining pins

2. Caliper mounting bolts

2. If the caliper is to be overhauled, remove the brake pads and remove the caliper from the motorcycle.

3. If not, unscrew the mounting bolts and remove the caliper complete with pads.

Overhaul

1. Separate the caliper and mounting bracket.

2. Cover the caliper opening with a clean, heavy cloth and, using either compressed air or by reconnecting the master cylinder and pumping the brake lever, eject both pistons from the caliper at the same time.

WARNING: To prevent injury, never place fingers or hands inside the caliper opening when removing the pistons. Always wear eye, hand and face protection when using compressed air. Eye, face and skin damage will result from direct contact with compressed air.

3. Extract the dust seals and piston seals, taking care not to damage the caliper bores.

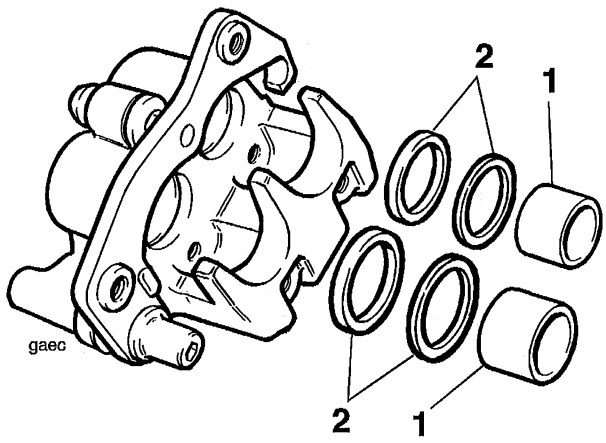
4. Check the pistons, caliper and mounting bracket for signs of damage, paying particular attention to the caliper bores and pistons. If damage is present, renew the worn component or the complete caliper assembly.

5. If all components are serviceable, obtain a piston seal kit and reassemble the caliper as follows.

WARNING: Always renew caliper seals after removal of the pistons. An effective hydraulic seal can only be made if new seals are fitted.

A dangerous riding condition leading to an accident could result if this warning is ignored.

6. Ensure all components are clean and dry then fit the **new** seals to their grooves in the caliper bores.



1. Pistons

2. Seals

7. Lubricate the fluid seals, caliper bore and the outside of the pistons with clean DOT 4 brake fluid.

8. Ease the pistons squarely back into the bores, taking care not to displace the seals.

9. Lubricate the mounting bracket pins with lithium-based grease then reassemble the bracket and caliper. Ensure the pin gaiters are correctly located on both the bracket and caliper.

Installation

1. If the caliper has been overhauled, install the brake pads.

2. Slide the caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **40 Nm.**

3. Position a **new** sealing washer on each side of the brake hose end fitting then secure the hose to the caliper with the banjo bolt. Tighten the banjo bolt to **25 Nm.**

4. Bleed the rear brake.

5. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

REAR BRAKE MASTER CYLINDER

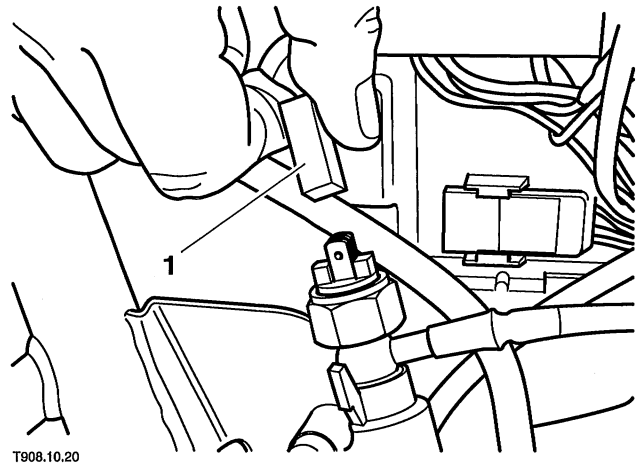
NOTE:

- **Read through the safety precautions before proceeding.**

Removal - Bonneville & Bonneville T100

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

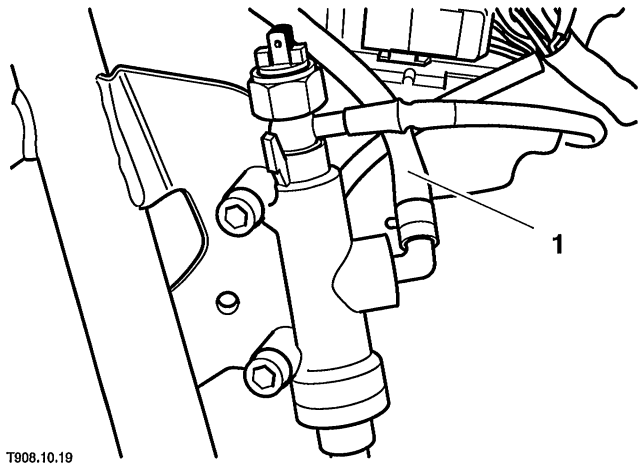
1. Remove the right-hand side cover.
2. Disconnect the wiring connectors from the rear brake light switch.



T908.10.20

1. Wiring connector

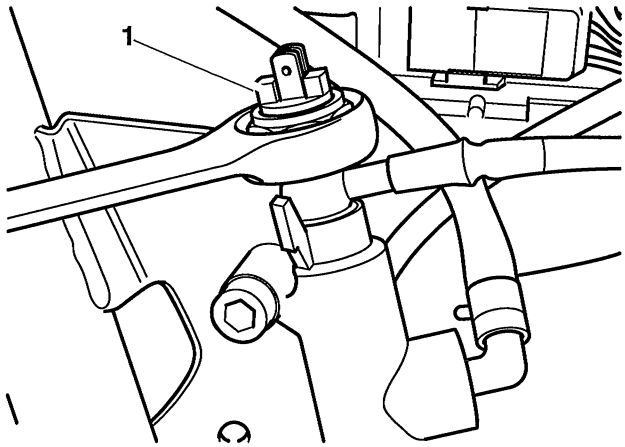
3. Disconnect the reservoir hose from the master cylinder and drain the brake fluid into a container.



T908.10.19

1. Reservoir hose

4. Position a cloth beneath the hose to catch any spilt fluid then unscrew the brake light switch. Disconnect the brake hose from the master cylinder and discard the sealing washers. Keep the hose end upright to minimise fluid loss.



T908.10.21

1. Rear brake light switch

5. Slide off the retaining clip and remove the clevis pin securing the master cylinder pushrod to the pedal.
6. Unscrew the mounting bolts and remove the master cylinder.

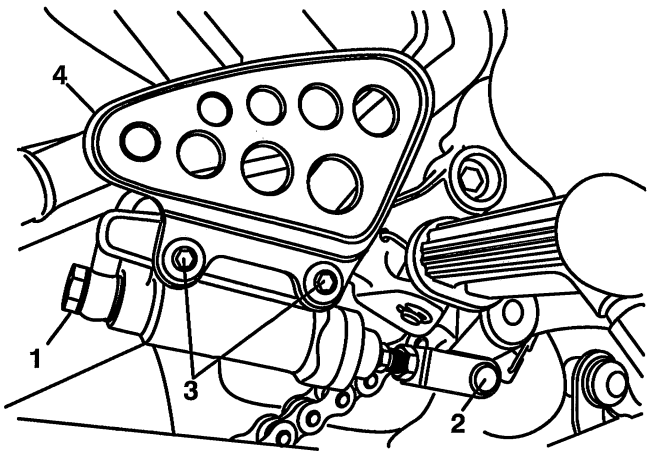
Removal - Thruxton

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the right-hand side cover.

2. Disconnect the reservoir hose from the maste cylinder and drain the brake fluid into a container.

3. Position a cloth beneath the steel brake pipe t catch any spilt fluid then unscrew the banjo bolt Disconnect the brake pipe from the master cylinde without bending it, and discard the sealing washers



1. Banjo bolt

2. Clevis pin

3. Mounting bolts

4. Heel guard

4. Slide off the clip and remove the clevis pin securing the master cylinder pushrod to the pedal.

5. Unscrew the mounting bolts and remove the master cylinder together with the right hand heel guard.

WARNING: Do not bend the brake pipe to allow access to the master cylinder.

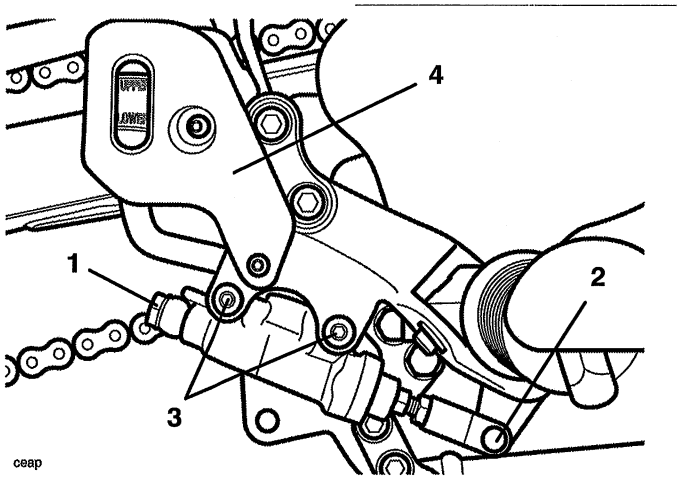
Bending the brake pipe could cause fluid restrictions or cracks in the pipe which could lead to reduced rear brake performance or rear brake failure.

Reduced rear brake performance and/or failure could lead to loss of motorcycle control and an accident.

Removal - Scrambler

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Unscrew the bolts and remove the heel guard.



ceap

1. Banjo bolt

2. Clevis pin

3. Master cylinder mounting bolts

4. Heel guard

2. Disconnect the reservoir hose from the master cylinder and drain the brake fluid into a container.

3. Position a cloth beneath the brake pipe to catch any spilt fluid then unscrew the banjo bolt. Disconnect the brake pipe from the master cylinder and discard the sealing washers.

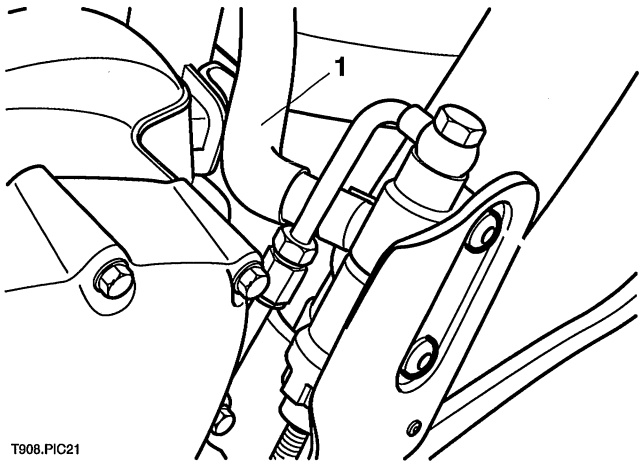
4. Slide off the clip and remove the clevis pin securing the master cylinder pushrod to the pedal.

5. Unscrew the mounting bolts and remove the master cylinder.

Removal - America & Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Disconnect the reservoir hose from the master cylinder and drain the brake fluid into a container.



1. Reservoir hose

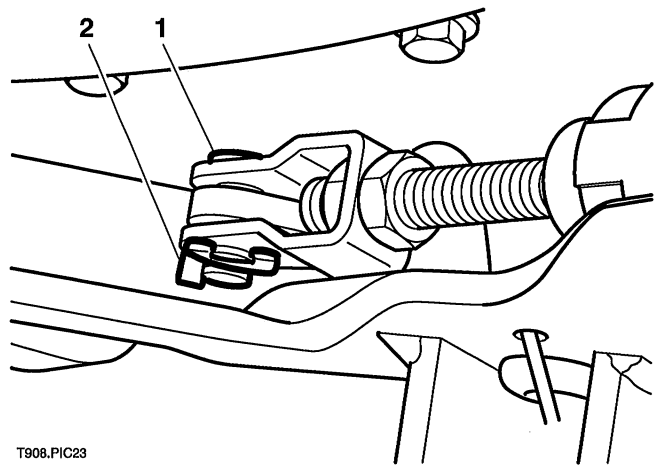
2. Position a cloth beneath the steel brake pipe to catch any spilt fluid then unscrew the banjo bolt. Disconnect the brake pipe from the master cylinder, without bending it, and discard the sealing washers.

WARNING: Do not bend the brake pipe to allow access to the master cylinder.

Bending the brake pipe could cause fluid restrictions or cracks in the pipe which could lead to reduced rear brake performance or rear brake failure.

Reduced rear brake performance and/or failure could lead to loss of motorcycle control and an accident.

3. Slide off the clip and remove the clevis pin securing the master cylinder pushrod to the pedal.

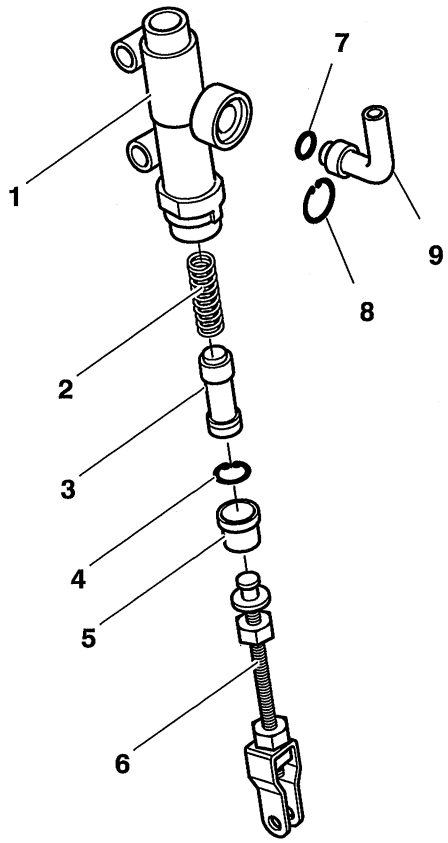


1. Clevis pin

2. Clip

4. Unscrew the mounting bolts and remove the master cylinder.

Overhaul



Rear brake master cylinder assembly
1. Master cylinder body
2. Spring
3. Piston assembly
4. Circlip
5. Dust boot
6. Pushrod assembly
7. O-ring
8. Circlip
9. Fluid reservoir union

1. Free the dust boot from the end of the master cylinder bore.

2. Remove the circlip then remove the pushrod assembly.

3. Withdraw the piston assembly and spring, noting all components correct fitted location and orientation.

4. Remove the circlip and remove the fluid reservoir union and O-ring from the master cylinder.

5. Check all components for signs of damage, paying particular attention to the cylinder bore and piston assembly. If the master cylinder bore is damaged, renew the complete assembly.

6. If the master cylinder is serviceable, obtain a new piston kit and reassemble as follows.

> **WARNING: Always renew the piston assembly every time it is removed. An effective hydraulic seal can only be made if a new assembly is fitted.**
>
> **A dangerous riding condition leading to loss of control and an accident could result if this warning is ignored.**

7. Ensure all components are clean and dry.

8. Lubricate the **new** piston assembly and the cylinder bore with clean DOT 4 brake fluid.

9. Fit the **new** spring ensuring its tapered end is facing the piston assembly.

10. Ensure the piston assembly is the correct way around then ease it into the master cylinder with a twisting motion. Take great care not to displace the seals as they enter the bore.

11. Lubricate the pushrod and piston ends with brake grease then fit the pushrod assembly. Depress the piston and secure the pushrod in position with the circlip, ensuring it is correctly located in the cylinder groove.

12. Check the operation of the master cylinder then seat the dust boot correctly in the cylinder bore.

13. Ensure the O-ring is in position then fit the reservoir union. Secure it in position with the circlip, ensuring it is correctly located in the groove.

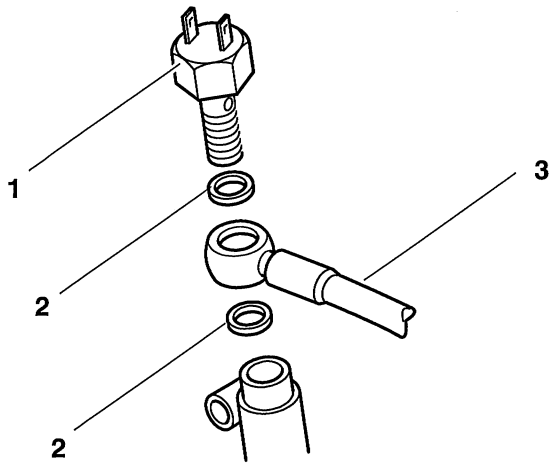
Installation - Bonneville & Bonneville T100

1. Ensure the pushrod length is correctly set. The distance from the centre of the lower mounting bolt hole to the centre of the pushrod clevis pin hole should be 200.6 mm. If necessary, slacken the locknuts and adjust the clevis position. Once the length is correct, tighten the locknuts to **18 Nm**.

2. Fit the master cylinder and tighten its mounting bolts to **18 Nm**.

3. Align the pushrod clevis with the pedal and insert the clevis pin. Fit the retaining clip ensuring it is correctly located in the pin groove.

4. Position a **new** sealing washer on each side of the brake hose end fitting then secure the hose to the master cylinder with the brake light switch. Tighten the switch to **15 Nm**.



1. Rear brake light switch

2. Sealing washer

3. Brake hose

5. Reconnect the brake light switch wiring connectors.

6. Reconnect the reservoir hose to the master cylinder and secure it in position with the clip.

7. Fill the reservoir with clean DOT 4 brake fluid then bleed the rear brake.

8. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

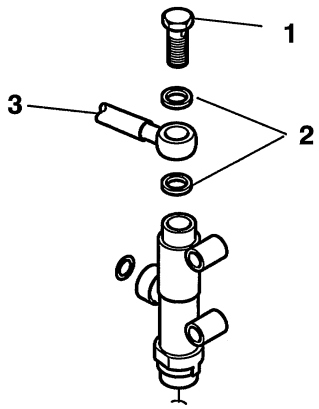
Installation - America & Speedmaster

1. Ensure the pushrod length is correctly set. The distance from the centre of the lower mounting bolt hole to the centre of the pushrod clevis pin hole should be 96 mm. If necessary, slacken the locknuts and adjust the clevis position. Once the length is correct, tighten the locknuts to **18 Nm.**

2. Fit the master cylinder and tighten its mounting bolts to **27 Nm.**

3. Align the pushrod clevis with the pedal and insert the clevis pin. Fit the retaining clip ensuring it is correctly located in the pin groove.

4. Position a **new** sealing washer on each side of the brake pipe end fitting then secure the pipe to the master cylinder with the banjo bolt. Tighten the banjo bolt to **25 Nm.**



1. Banjo bolt

2. Sealing washer

3. Brake hose

WARNING: Do not bend the brake pipe when reconnecting it to the master cylinder.

Bending the brake pipe could cause fluid restrictions or cracks in the pipe which could lead to reduced rear brake performance or rear brake failure.

Reduced rear brake performance and/or failure could lead to loss of motorcycle control and an accident.

5. Reconnect the reservoir hose to the master cylinder and secure it in position with the clip.

6. Fill the reservoir with clean DOT 4 brake fluid then bleed the rear brake.

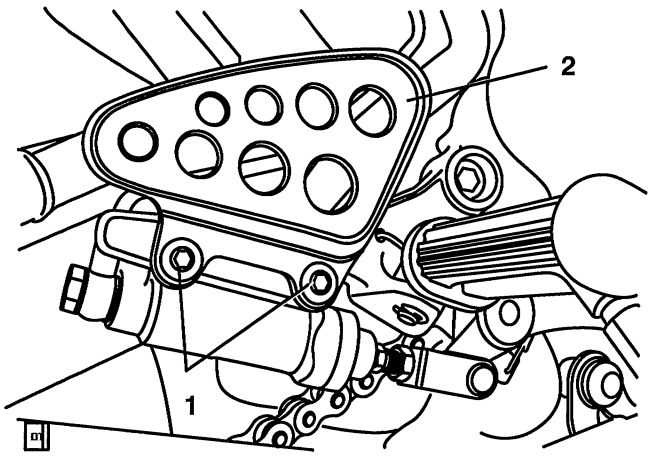
7. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

Installation - Thruxton

1. Ensure the pushrod length is correctly set. The distance from the centre of the lower mounting bolt hole to the centre of the pushrod clevis pin hole should be 82 mm. If necessary, slacken the locknuts and adjust the clevis position. Once the length is correct, tighten the locknuts to **18 Nm**.

2. Fit the master cylinder together with the right hand heel guard and tighten the mounting bolts to **27 Nm.**

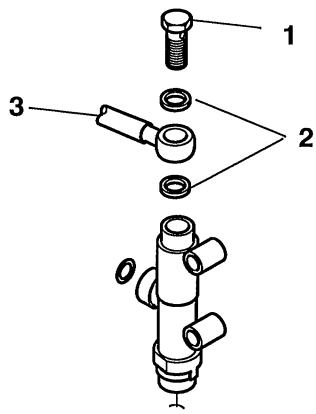


1. Master cylinder mounting bolts

2. Heel guard

3. Align the pushrod clevis with the pedal and insert the clevis pin. Fit the retaining clip ensuring it is correctly located in the pin groove.

4. Position a **new** sealing washer on each side of the brake pipe end fitting then secure the pipe to the master cylinder with the banjo bolt. Tighten the banjo bolt to **25 Nm.**



1. Banjo bolt

2. Sealing washer

3. Brake hose

WARNING: Do not bend the brake pipe when reconnecting it to the master cylinder.

Bending the brake pipe could cause fluid restrictions or cracks in the pipe which could lead to reduced rear brake performance or rear brake failure.

Reduced rear brake performance and/or failure could lead to loss of motorcycle control and an accident.

5. Reconnect the reservoir hose to the master cylinder and secure it in position with the clip.

6. Fill the reservoir with clean DOT 4 brake fluid then bleed the rear brake.

7. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

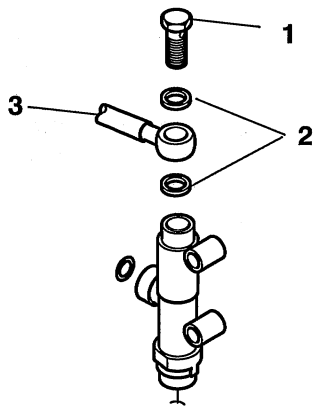
Installation - Scrambler

1. Ensure the pushrod length is correctly set. The distance from the centre of the lower mounting bolt hole to the centre of the pushrod clevis pin hole should be 80 mm. If necessary, slacken the locknuts and adjust the clevis position. Once the length is correct, tighten the locknuts to **18 Nm.**

2. Fit the master cylinder and tighten its mounting bolts to **18 Nm.**

3. Align the pushrod clevis with the pedal and insert the clevis pin. Fit the retaining clip ensuring it is correctly located in the pin groove.

4. Position a **new** sealing washer on each side of the brake pipe end fitting then secure the pipe to the master cylinder with the banjo bolt. Tighten the banjo bolt to **25 Nm.**



1. Banjo bolt

2. Sealing washer

3. Brake hose

5. Reconnect the reservoir hose to the master cylinder and secure it in position with the clip.

6. Fit the heel guard and tighten its fixings to **3 Nm.**

7. Fill the reservoir with clean DOT 4 brake fluid then bleed the rear brake.

8. Check the operation of the brake and carry out a thorough leak check before riding the motorcycle.

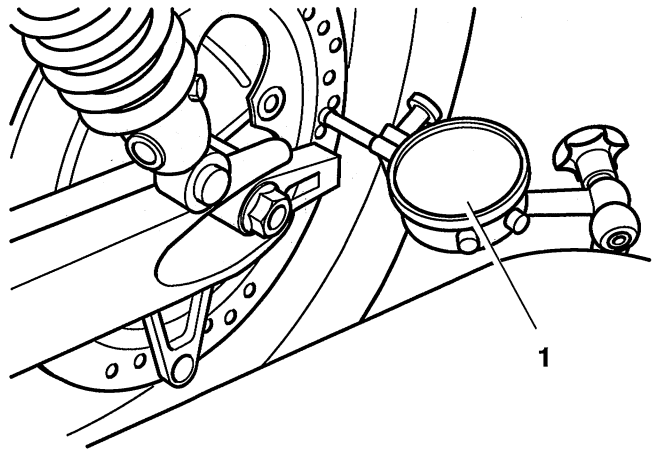
WARNING: It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph Dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

REAR BRAKE DISC

Inspection

1. Support the motorcycle on a stand so that the rear wheel is raised clear of the ground. Using a dial gauge, rotate the wheel and measure the disc runout.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

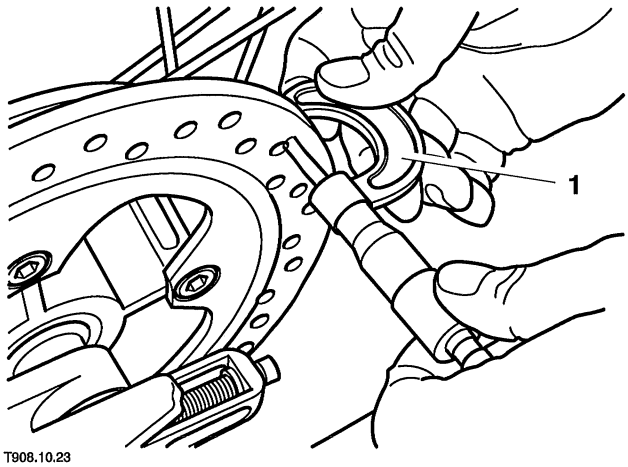


1. Dial gauge

Disc runout

Standard	**Less than 0.15 mm**
Service limit	**0.30 mm**

2. Using a micrometer, measure the disc thickness at several points.



T908.10.23

1. Micrometer

Disc thickness

Standard	**6.00 mm**
Service limit	**5.00 mm**

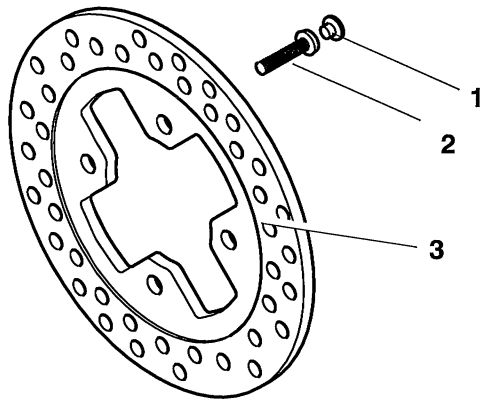
3. If the disc is warped or worn beyond the specified service limit, it must be renewed.

Removal

1. Remove the rear wheel as described in the wheels section.

CAUTION: Never allow the weight of the wheel to rest on the disc as this could cause the disc to warp.

2. Remove the trim caps from the disc retaining bolts.



1. Trim cap

2. Bolt

3. Disc

3. Evenly and progressively slacken the retaining bolts then remove the disc from the wheel. Discard the bolts.

Installation

1. Ensure the disc and wheel surfaces are clean.
2. Fit the disc ensuring its marked surface is facing outwards.
3. Fit the **new** retaining bolts and tighten them evenly and progressively to **22 Nm.**
4. Fit a trim cap to each retaining bolt.
5. Clean and degrease the disc then refit the rear wheel as described in the wheels section.

NOTE:

- **If a new disc has been fitted, ensure new brake pads are also installed.**

FRONT SUSPENSION & STEERING

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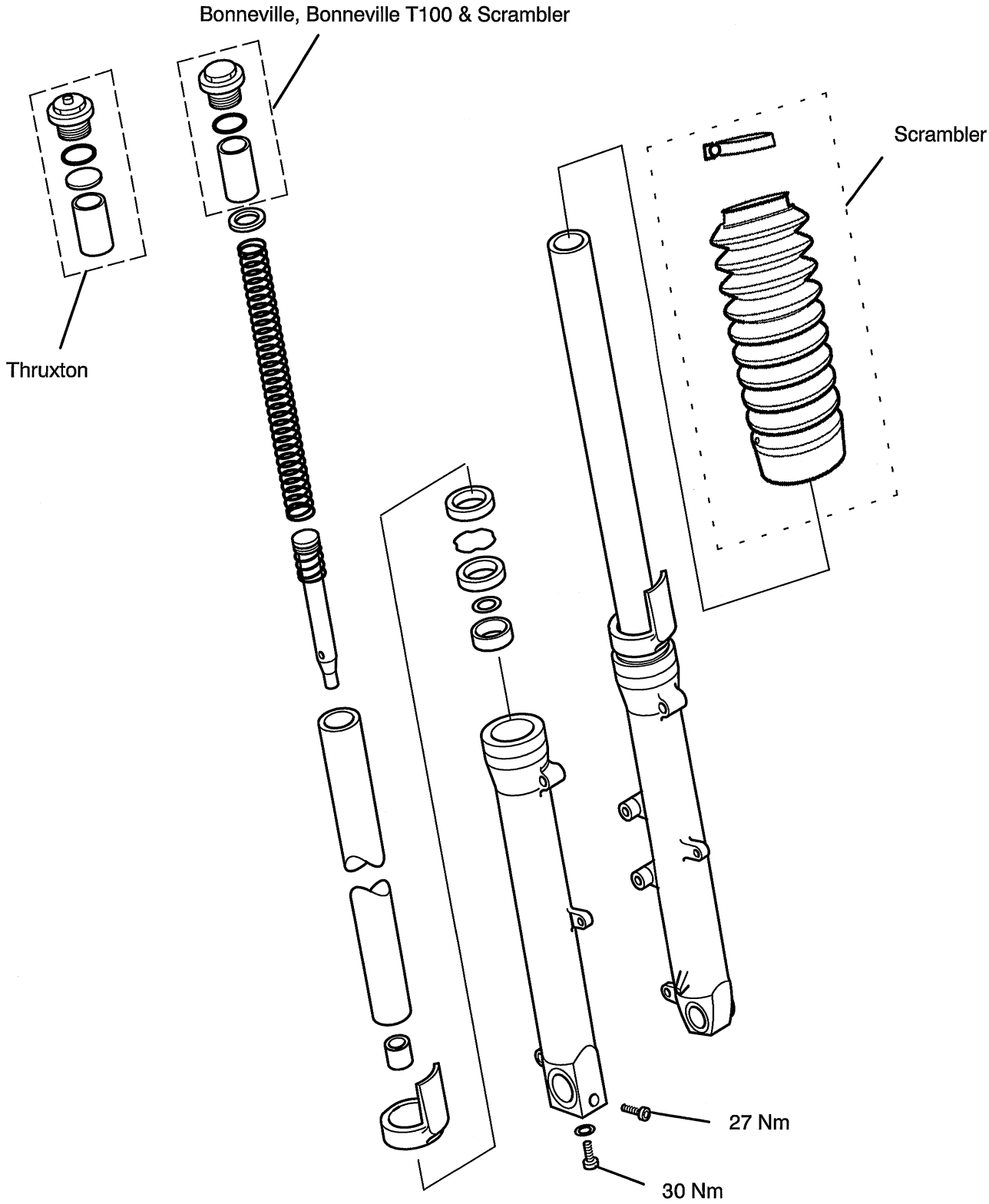
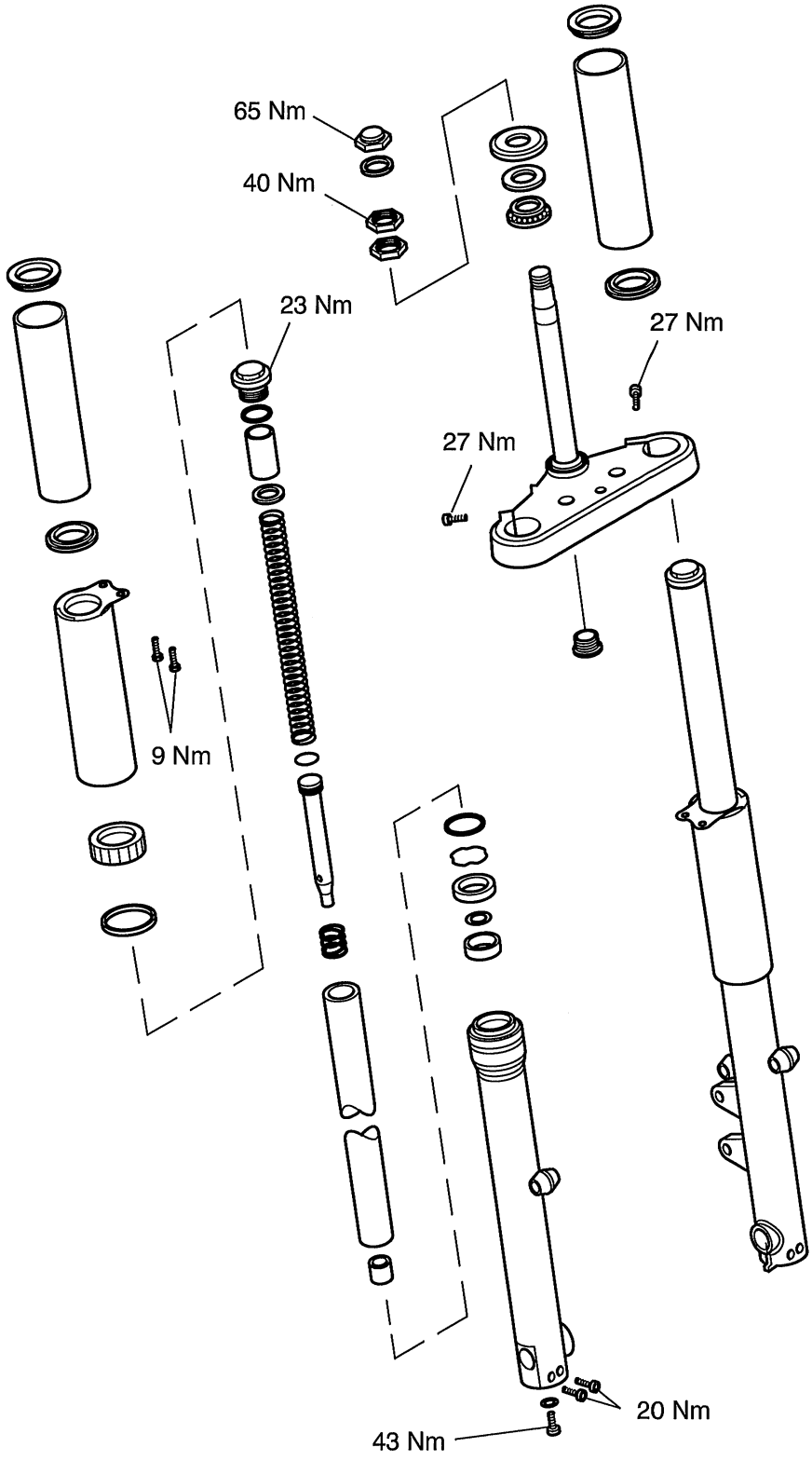
Exploded View

Front Fork - Bonneville, Bonneville T100, Scrambler & Thruxton



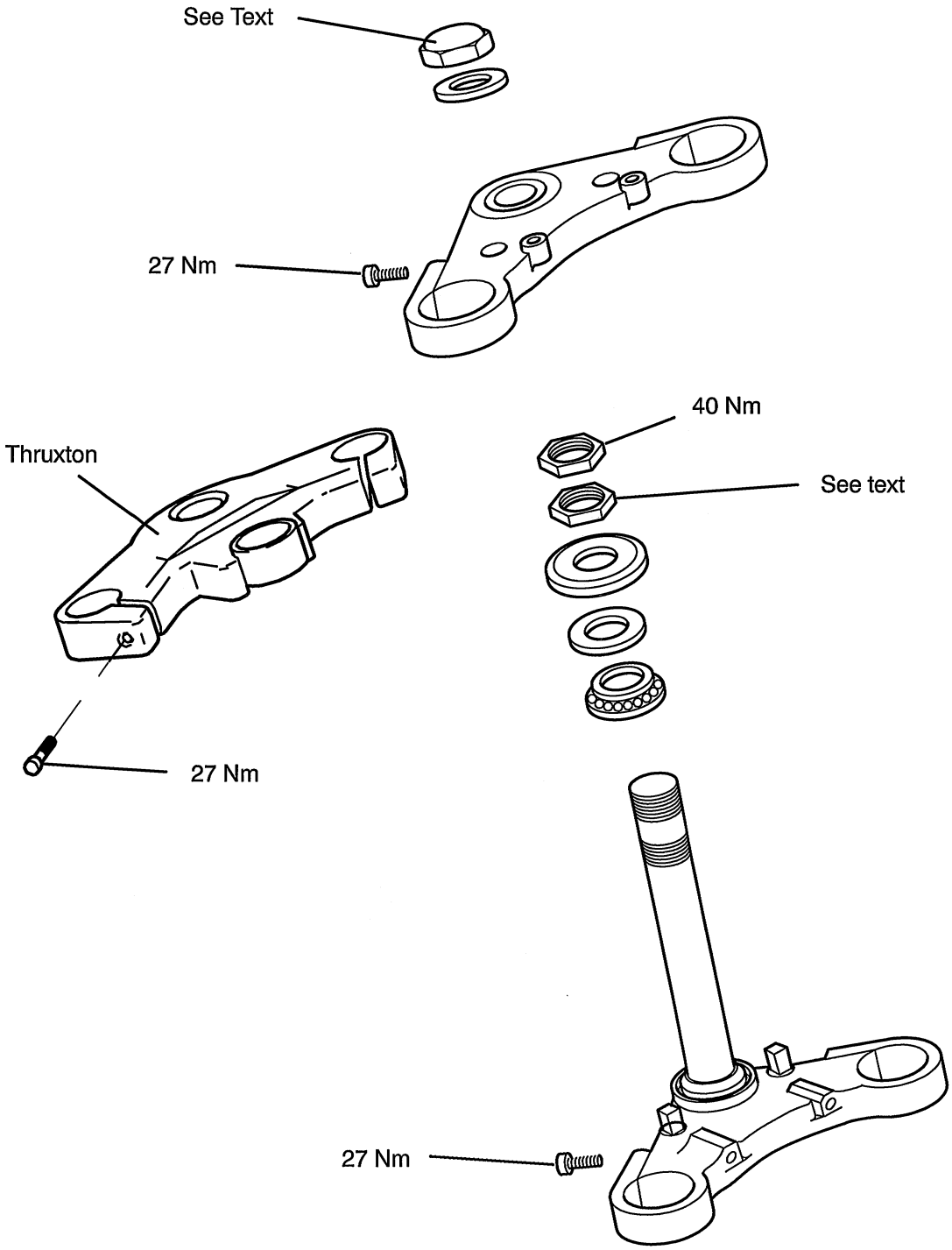
Exploded View

Front Fork - America & Speedmaster



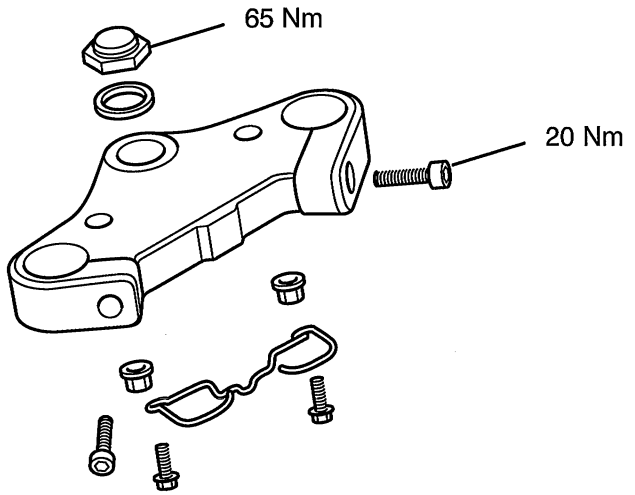
Exploded View

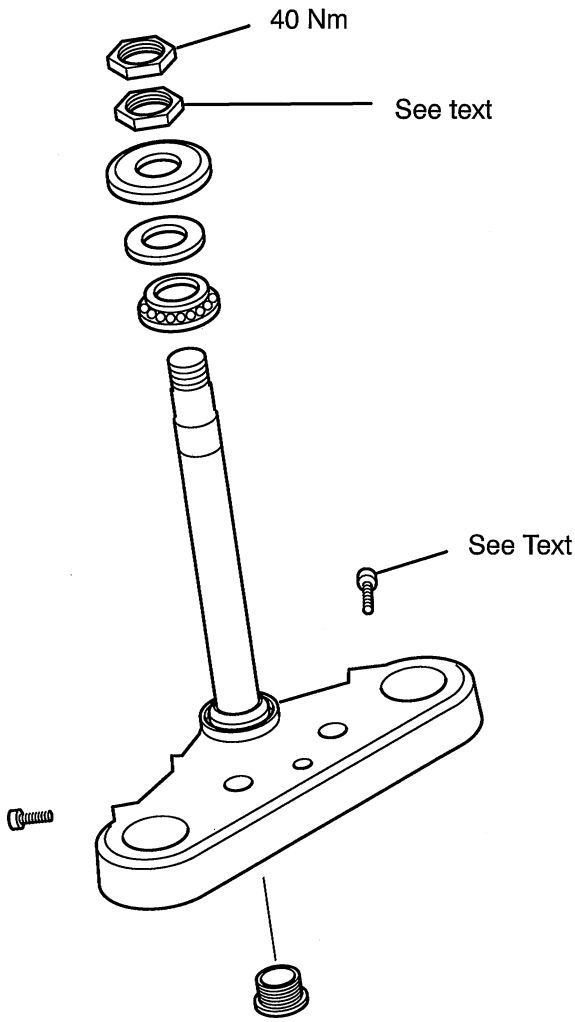
Top and Bottom Yokes/Steering Head Bearings - Bonneville, Bonneville T100, Scrambler & Thruxton



Exploded View

Top and Bottom Yokes/Steering Head Bearings - America & Speedmaster





FORK INSPECTION

1. Visually inspect the fork inner tube assembly for stone-chips and damage. Repair or replace as necessary.

2. Visually inspect the dust/oil seal areas for signs of damage and fluid leaks. If oil leaks are found, the fork must be stripped and overhauled or replaced completely.

3. Check for smooth operation of the forks as follows:

   - Place the motorcycle on level ground.

   - While holding the handlebars and applying the front brake, pump the forks up and down several times. The forks should operate smoothly with no excessive stiffness, roughness or tight spots

WARNING: If roughness or excessive stiffness is detected, investigate the cause and take the necessary remedial action before riding the motorcycle.

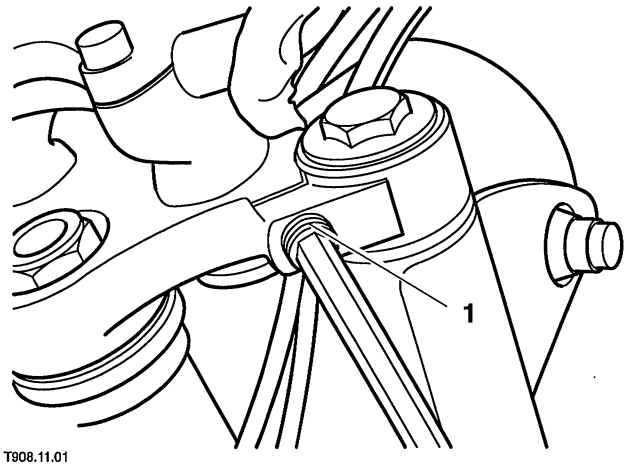
Riding the motorcycle with defective or damaged suspension can cause loss of control and an accident.

FRONT FORK

Removal - Bonneville, Scrambler & Bonneville T100

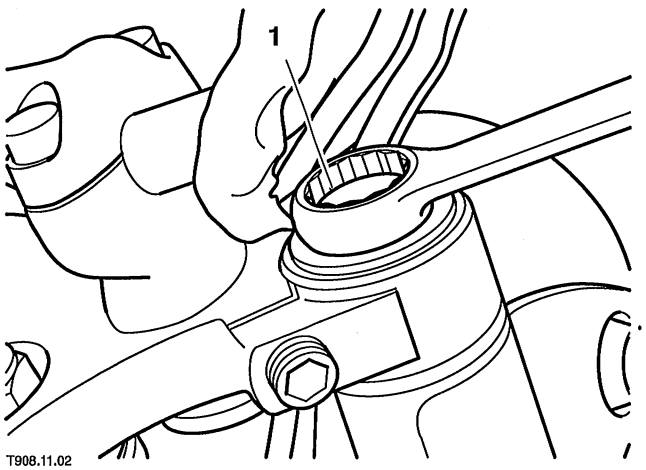
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the front wheel.
2. Remove the front mudguard (see frame/bodywork section). Each fork can be removed as follows.
3. Slacken the top yoke clamp bolt.



1. Top yoke clamp bolt

4. If the fork is to be dismantled, loosen the fork's top cap.

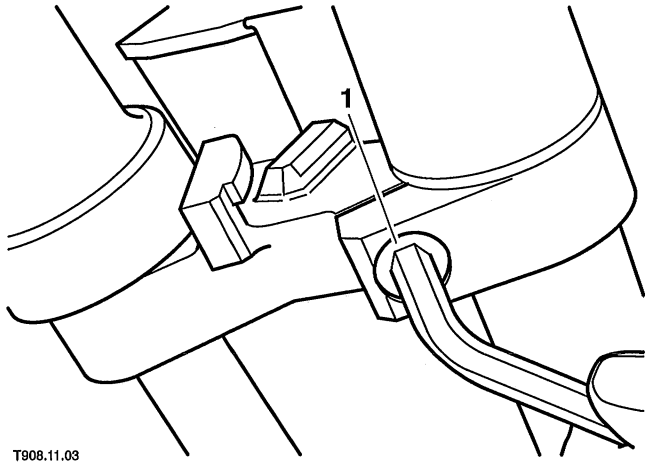


1. Top cap

5. Slacken the bottom yoke clamp bolt and slide the fork out of the yokes.

NOTE:

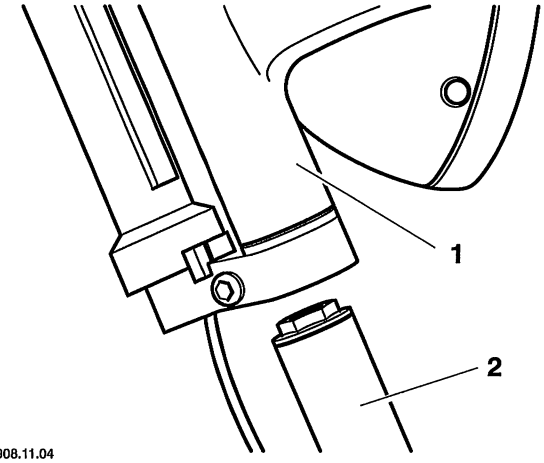
- **If both forks are being removed, ensure the headlight assembly is securely supported.**



1. Bottom yoke clamp bolt

Installation - Bonneville, Scrambler & Bonneville T100

1. Ensure the headlight brackets and mounting rubbers are correctly positioned then slide the fork into the yokes from below.



T908.11.04

1. Headlight bracket

2. Fork

2. Position the fork so that the fork upper surface is flush with the upper surface of the top yoke. Tighten the bottom yoke clamp bolt to **27 Nm**.

3. If the fork has been dismantled, tighten the top cap to **23 Nm**.

4. Tighten the top yoke clamp bolt to **27 Nm**.

5. Refit the front mudguard.

6. Install the front wheel.

FRONT FORK

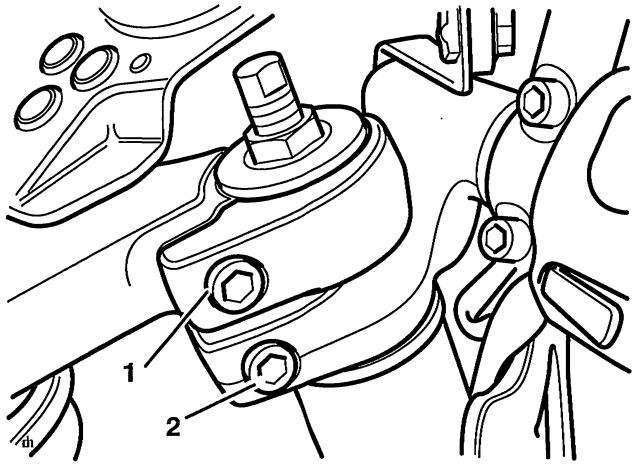
Removal - Thruxton

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the front wheel (see Wheels section).
2. Remove the front mudguard (see frame/bodywork section). Each fork can be removed as follows.
3. Slacken the top yoke clamp bolt and the handlebar clamp bolt.

NOTE:

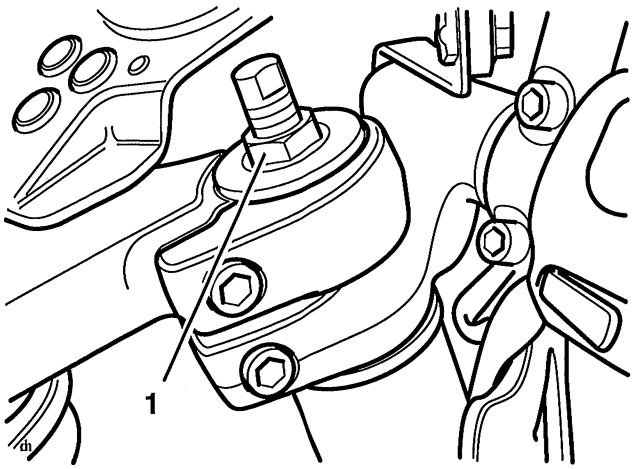
- **It is not necessary to remove the handlebar.**



1. Top yoke clamp bolt

2. Handlebar clamp bolt

4. If the fork is to be dismantled, loosen the fork's top cap.

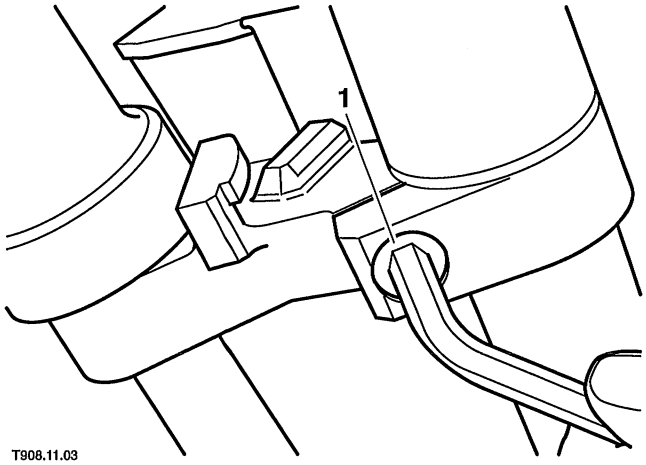


1. Top cap

5. Slacken the bottom yoke clamp bolt and slide the fork out of the yokes.

NOTE:

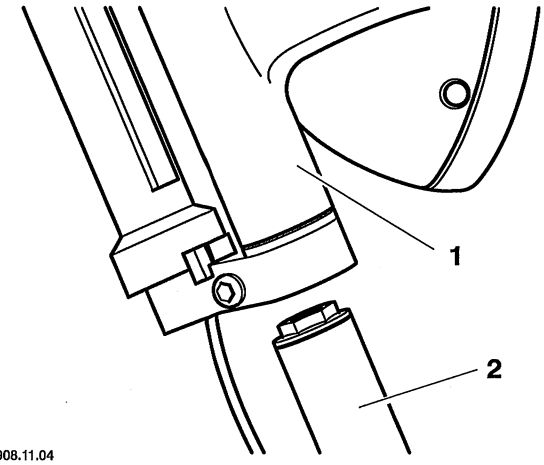
- **If both forks are being removed, ensure the headlight assembly is securely supported.**



1. Bottom yoke clamp bolt

Installation - Thruxton

1. Ensure the headlight tubes and mounting rubbers are correctly positioned then slide the fork into the yokes from below.



T908.11.04

1. Headlight bracket

2. Fork

2. Position the fork so that the fork upper surface is flush with the upper surface of the top yoke. Tighten the bottom yoke clamp bolt to **27 Nm**.

3. If the fork has been dismantled, tighten the top cap to **23 Nm**.

4. Tighten the top yoke clamp bolt to **27 Nm**.

4. Tighten the handlebar clamp bolt to **27 Nm.**

5. Check the torque of the anti rotation bolt found on the underside of the handlebar clamp. The correct torque is **11 Nm.**

5. Refit the front mudguard.

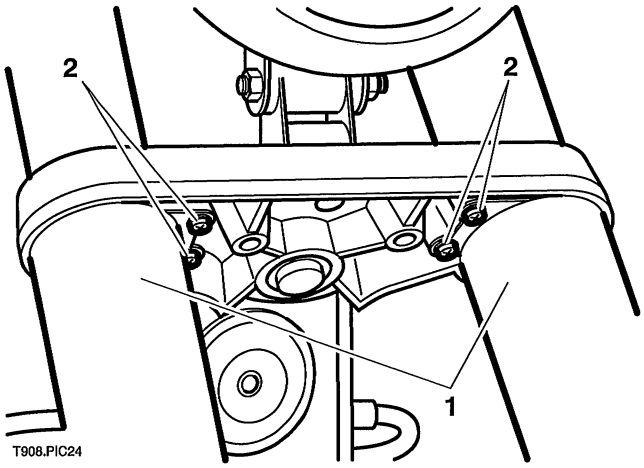
6. Install the front wheel.

FRONT FORK

Removal - America & Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

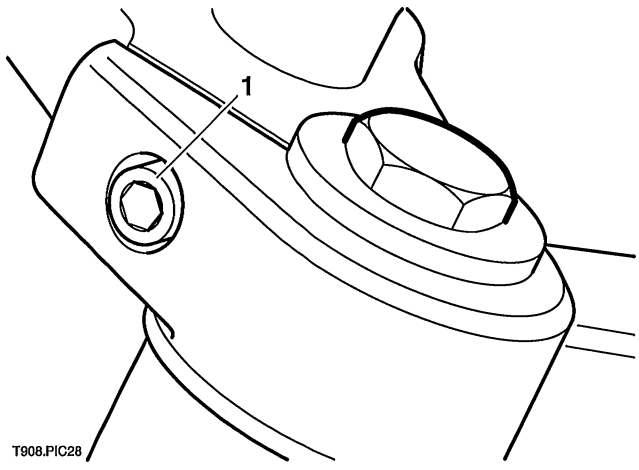
1. Remove the front wheel.
2. Remove the front mudguard (see frame/bodywork section).
3. Release the lower fork shrouds from the under-side of the bottom yoke. Protect the mudguard mountings with tape then allow the shrouds to rest on the mudguard mounting lugs.



1. Fork shrouds

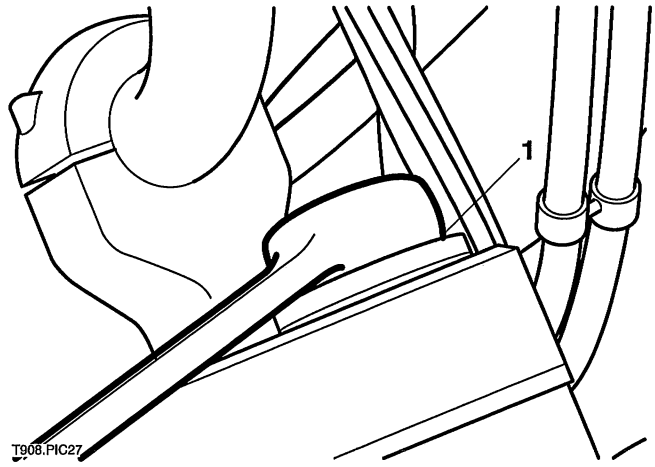
2. Fork shroud fixings

4. Slacken the top yoke clamp bolt.



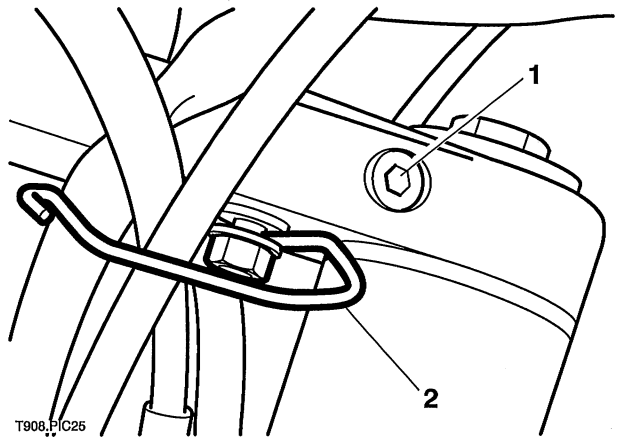
1. Top yoke clamp bolt

5. If the fork is to be dismantled, loosen the fork's top cap.



1. Top cap

6. Slacken the bottom yoke clamp bolt and slide the fork out of the yokes. Take care to not damage the cables in the wire guide.



1. Bottom yoke clamp bolt

2. Cable guide

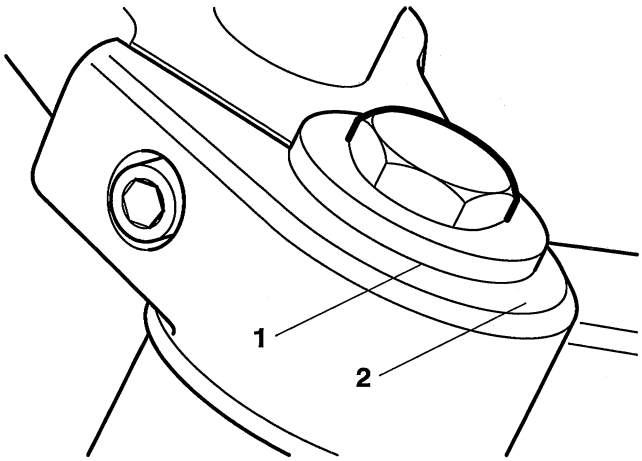
NOTE:

- **The upper fork shrouds will remain situated between the upper and lower yokes.**

7. Slide the lower fork shrouds up the forks and withdraw from the top.

Installation - America & Speedmaster

1. Position the lower fork shrouds over the forks resting them on the mudguard mounting lugs.
2. Slide the forks into the yokes ensuring the upper fork shrouds remain in position.
3. Position the fork so its inner tube upper surface is flush to the upper surface of the top yoke then tighten the bottom yoke clamp bolt to **45 Nm.**



1. Upper yoke top surface

2. Fork inner tube

4. If the fork has been dismantled, tighten the top cap to **23 Nm.**
5. Tighten the top yoke clamp bolt to **20 Nm.**
6. Refit the front mudguard as detailed in the body section.
7. Install the front wheel.

FORK OIL CHANGE

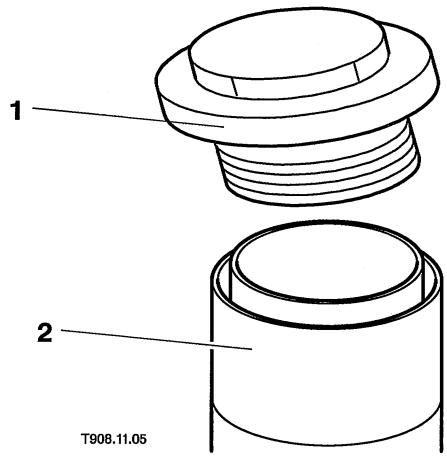
Oil draining

1. Remove the fork assembly.
2. Secure the fork inner tube upright in a soft jawed vice.

CAUTION: When securing the fork in a vice, take great care not to overtighten the vice as this will cause the fork tube to distort beyond repair.

3. Carefully unscrew the top cap from the inner tube.

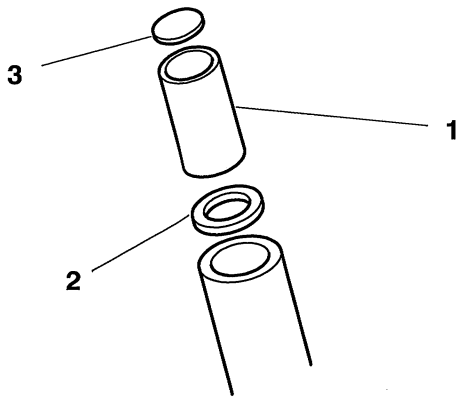
WARNING: The top cap is under pressure from the fork spring. As the last few threads of the cap are unscrewed, keep the cap pushed firmly into the tube to prevent it being forcibly expelled as the threads release. To prevent injury, always wear eye, face and hand protection when removing the top cap.



1. Top cap (Bonneville)

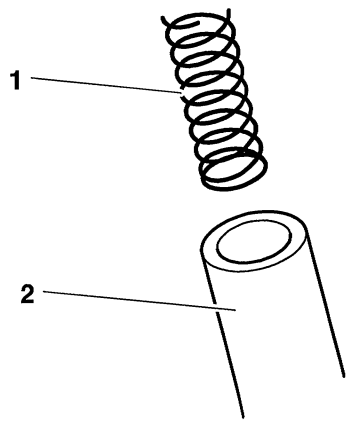
2. Fork tube

4. Remove the spacer and spring seat (On Thruxton models, also remove the disc washer).



1. Spacer
2. Spring seat
3. Disc washer (Thruxton only)

5. Lift out the spring.



1. Spring

2. Fork tube

6. Invert the fork and pour out the fork oil into a suitable container. Pump the fork assembly to remove all oil.

Oil refilling

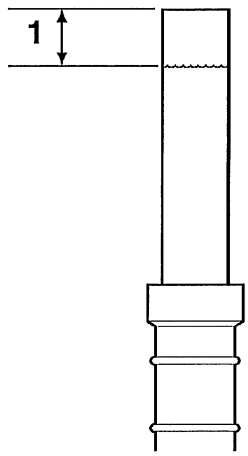
	Bonneville & Bonneville T100
Fork oil type	Kayaba G10
Fork oil capacity	484 cc
Fork oil level (fork fully compressed)	120 mm below inner tube upper surface.

	America & Speedmaster
Fork oil type	Kayaba G10
Fork oil capacity	484 cc
Fork oil level (fork fully compressed)	166 mm below inner tube upper surface.

	Thruxton
Fork oil type	Kayaba G10
Fork oil capacity	466 cc
Fork oil level (fork fully compressed)	143 mm below inner tube upper surface.

	Scrambler
Fork oil type	Kayaba G10
Fork oil capacity	517 cc
Fork oil level (fork fully compressed)	123 mm below inner tube upper surface.

WARNING: Any variation from the figures quoted above could result in an unsafe riding condition leading to loss of control and an accident.

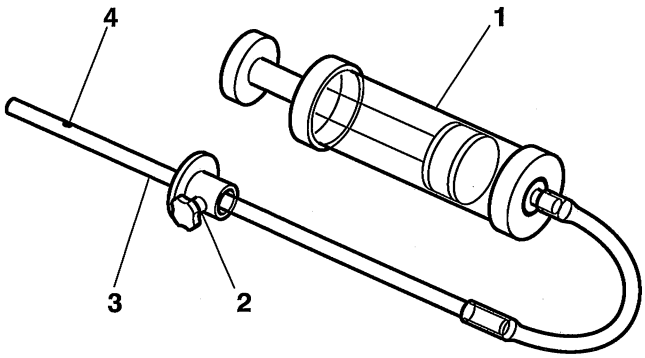


1. Fork oil level (fork fully compressed)

1. Upright the fork and fill it with the specified grade and type of fork oil until the oil level is slightly above the recommended level.

2. Pump the fork assembly several times to expel any trapped air then fully compress the fork and support it in an upright position. Leave the fork for a few minutes to allow the oil level to stabilise.

3. Set the scale on tool 3880160-T0301 to the specified level.



11.07-1

1. Tool 3880160-T0301

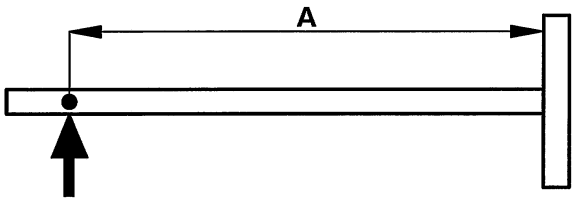
2. Adjuster plate

3. Scale area

4. Hole (zero position)

NOTE:

- **Zero level on the tool is set at the small exit hole in the side of the scale tube, NOT AT THE END TIP. Do not attempt to block this side hole as this will cause the final fluid level to be incorrect.**



Zero level measured from oil hole
Set dimension 'A' to the required oil level

TEC11.07-2

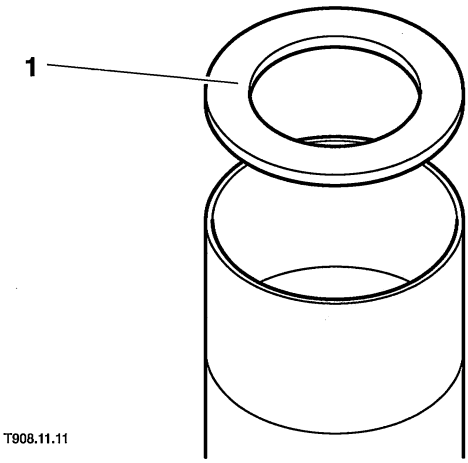
4. Insert the scale end of the tool into the fork inner tube.

5. Hold the tool adjuster plate level with the upper surface of the fork inner tube and draw fluid into the syringe until fluid flow ceases (empty the syringe if the body becomes full before fluid flow stops).

6. The fluid level in the fork is now set to the height set on the tool scale. Check the tool scale setting and repeat the process if incorrectly set.

7. Extend the inner tube and insert the fork spring.

8. Fit the spring seat and spacer(On Thruxton models, also insert the disc washer).



T908.11.11

1. Spring seat

9. Lubricate the O-ring with a smear of fork oil then screw the top cap fully into the inner tube.

WARNING: Keep the top cap under pressure until you are sure it is fully engaged with the inner tube threads. To prevent injury, always wear eye, face and hand protection when refitting the top cap.

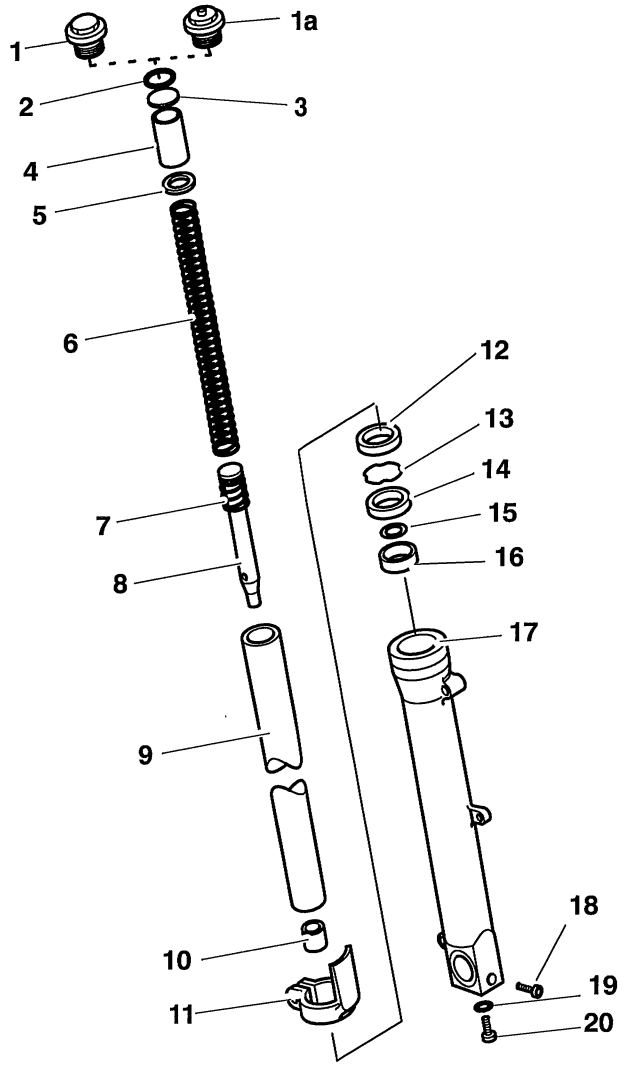
10. Refit the fork and tighten the top cap to **23 Nm.**

NOTE:

- **It is much easier to tighten the top cap when the fork is securely clamped in the bottom yoke.**

FRONT FORK

Disassembly - all models



Fork components

1. **Top cap (all except Thruxton)**
1a. **Top cap (Thruxton only)**
2. **O-ring**
3. **Disc washer (Thruxton only)**
4. **Spacer**
5. **Spring seat**
6. **Spring**
7. **Rebound spring**
8. **Damper rod**
9. **Inner tube**
10. **Damper rod seat**
11. **Fork protector (where fitted)**
12. **Dust seal**
13. **Circlip**
14. **Oil seal**
15. **Washer**
16. **Bush**
17. **Outer tube**
18. **Spindle clamp bolt (where fitted)**
19. **Sealing washer**
20. **Damper rod bolt**

1. Remove the fork assembly.

2. Prior to dismantling the fork, slacken the damper rod bolt a few turns.

> ⚠ **CAUTION: When securing the fork in a vice, take great care not to overtighten the vice as this will cause the fork tube to distort beyond repair.**

3. Drain the fork oil (see fork oil change).

4. Slacken and remove the damper rod bolt and sealing washer from the base of the outer tube. Discard the sealing washer.

5. Invert the fork and tip out the damper rod and rebound spring.

6. Slacken the screw and remove the protector from the outer tube.

7. Ease the dust seal out of position and slide it off the inner tube.

8. Carefully ease the circlip out from the top of the outer tube

NOTE:

- **Keep the fork fully compressed whilst removing the circlip. Any accidental damage to the inner tube will then be confined to the area which is normally above the oil seal.**

9. Compress the fork then pull the inner tube sharply out of the outer tube. Repeat this procedure until the top bush is forced out of position and the inner and outer tube can be separated.

10. Invert the outer tube and tip out the damper rod seat.

11. Slide the oil seal, washer and upper bush off from the top of the inner tube.

> ⚠ **CAUTION: Do not attempt to remove the lower bush from the inner tube unless it is to be renewed.**

Inspection

1. Thoroughly clean and examine all components for damage, wear, scoring, corrosion etc, paying particular attention to the bushes and damper rod piston ring. Renew as necessary.

2. Always renew the oil seal, dust seal and the damper rod bolt sealing washer every time the fork is dismantled.

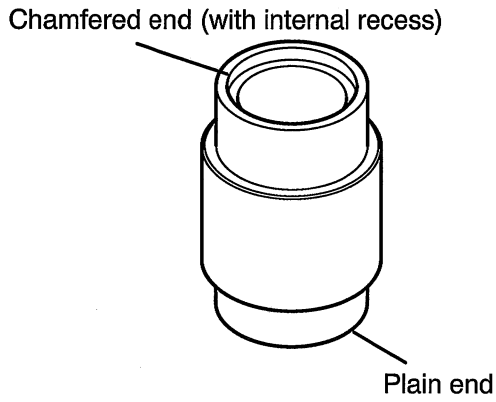
Assembly

WARNING: The front forks comprise many precision machined parts. Total cleanliness must be observed at all times and, assembly must take place in a dirt/dust-free environment.

Dirt ingress may cause damage to the fork parts, leading to incorrect operation, instability, loss of control or an accident.

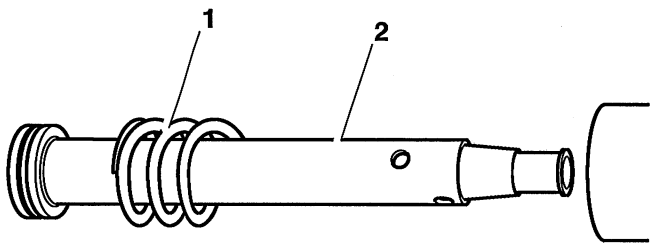
NOTE:

- **During assembly of the fork, tool 3880080-T0301 will be used extensively. In the text, reference to a plain end and a chamfered end will be made. This describes the two ends of the tool as shown in the diagram below.**



1. Lubricate the damper rod piston ring and the upper and lower bushes with clean fork oil.

2. Fit the rebound spring to the damper rod then insert the assembly into the inner tube.



T908.11.13

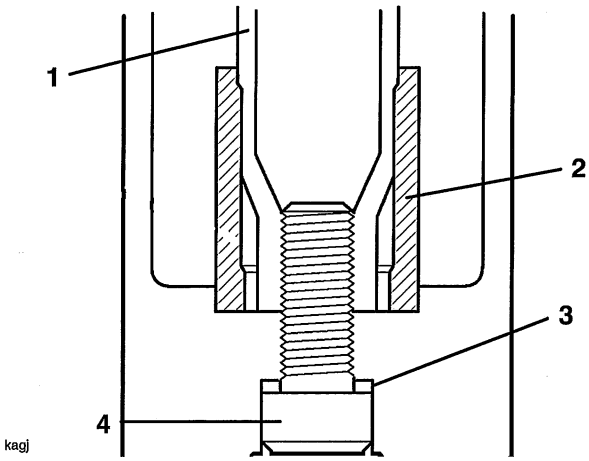
1. Rebound spring

2. Damper rod

3. Fit the seat securely to the end of the damper rod then insert the inner tube assembly into the outer tube.

4. Fit a **new** sealing washer to the damper rod bolt then apply locking compound (Three Bond 1342) to the bolt threads.

5. Ensure the damper rod and seat are correctly located in the outer tube then fit the damper rod bolt, tightening it to **30 Nm** (Bonneville/T100, Scrambler & Thruxton) and **43 Nm** (America & Speedmaster).



1. Damper rod

2. Seat

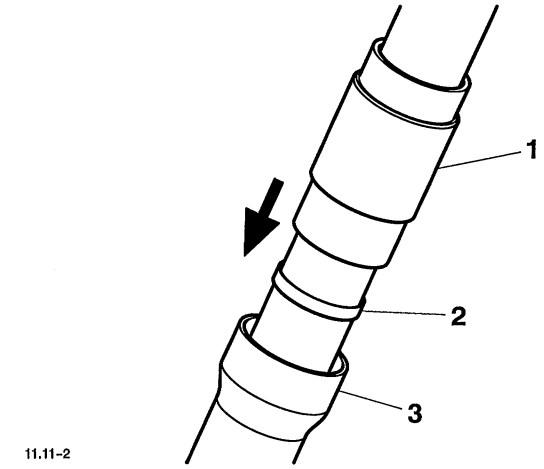
3. Sealing washer

4. Bolt

6. Slide the top bush along the inner tube and locate it in the outer tube. Drift the bush into position using the plain end of tool 3880080-T0301.

NOTE:

- **Keep the fork fully compressed whilst installing the bush, oil seal and circlip. Any accidental damage to the inner tube will then be confined to the area which is normally above the oil seal.**



1. Tool 3880080-T0301

2. Top bush

3. Outer tube

7. Slide the washer along the inner tube and locate it in the outer tube.

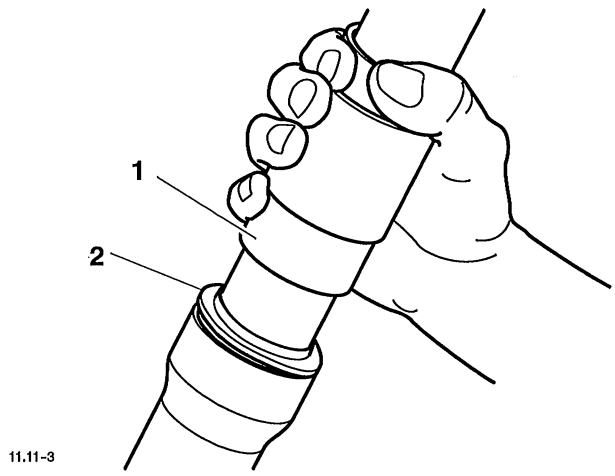
8. Lubricate the lip of the **new** oil seal with fork oil. Ensure the seal is the correct way around then ease it onto the inner tube. Drift the seal into position in the outer tube using the plain end of tool 3880080-T0301.

9. Secure the oil seal in position with the circlip, ensuring it is correctly located in its groove.

10. Fit the **new** dust seal onto the inner tube and drift it into position in the outer tube using the chamfered end of tool 3880080-T0301.

11. Refit the protector to the outer tube.

12. Refill the fork with new oil (see fork oil change).



1. Tool 3880080-T0301

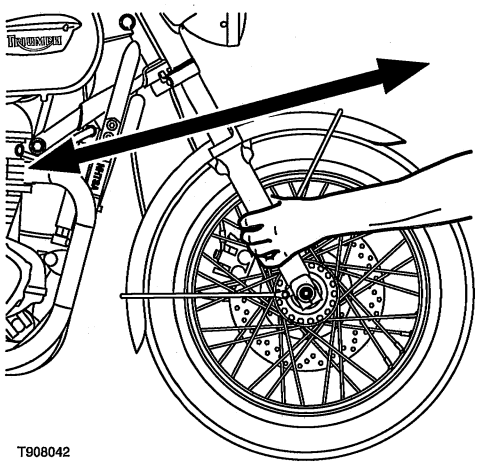
2. Dust seal

STEERING HEAD BEARING CHECK AND ADJUSTMENT

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

Check

1. Raise and support the motorcycle so the front wheel is clear of the ground.
2. Move the handlebars from lock-to-lock whilst checking for signs of tight spots or notchiness (bearings overtightened).
3. Hold the lower end of the front forks and try to move them forward and backward to check for signs of freeplay in the bearings (bearings insufficiently tightened or worn).

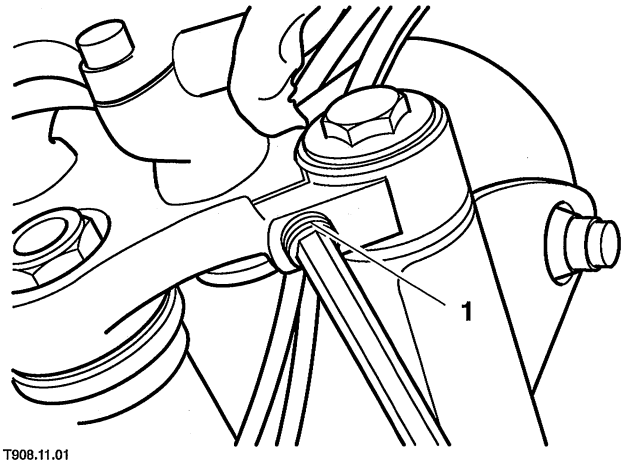


Checking for freeplay in steering head bearings

4. Adjust as described below then lower the motorcycle to the ground.

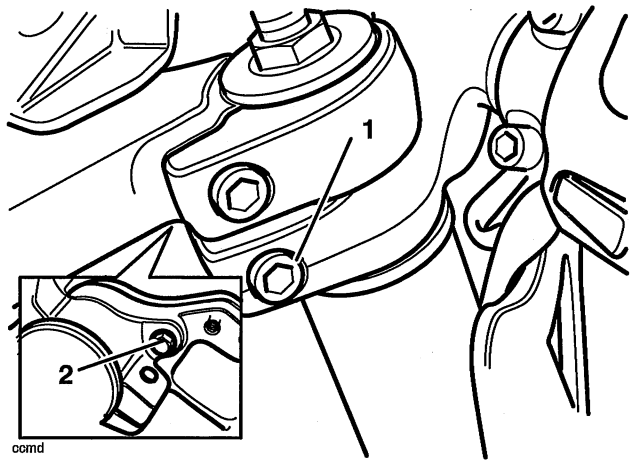
Adjustment

1. Slacken the top yoke clamp bolts.



1. Top yoke clamp bolt

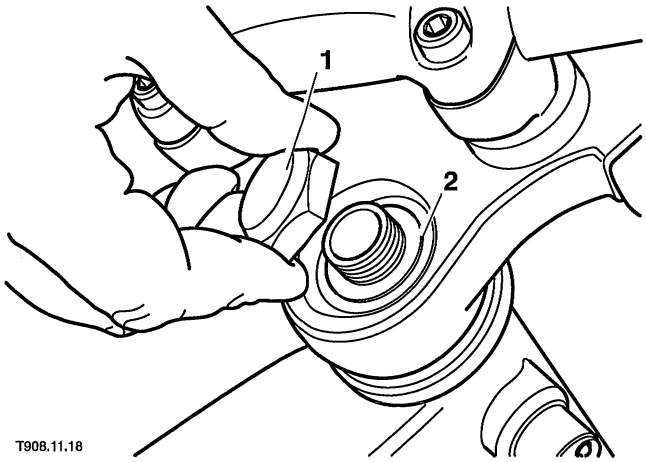
2. On Thruxton models slacken the handlebar clamp bolts and remove the handlebar locating bolts.



1. Handlebar clamp bolt

2. Handlebar locating bolt

3. Slacken and remove the top nut and washer from the steering stem. Lift the handlebar/top yoke assembly to gain access to the bearing locknut and adjuster nut.



1. Top nut

2. Washer

4. Slacken the locknut and adjuster nut.

5. Adjust the bearing freeplay as follows:-

   - Tighten the adjuster nut to **40 Nm.**
   - Rotate the handlebars from lock to lock a few times to settle the bearings then loosen the adjuster nut again.
   - Retighten the adjuster nut by hand until all bearing freeplay is eliminated.

WARNING: It is essential that the adjuster nut is not over-tightened. If the adjuster is over-tightened it will cause a pre-load on the steering head bearings. This will introduce tight steering which will lead to premature bearing wear and could cause loss of motorcycle control and an accident.

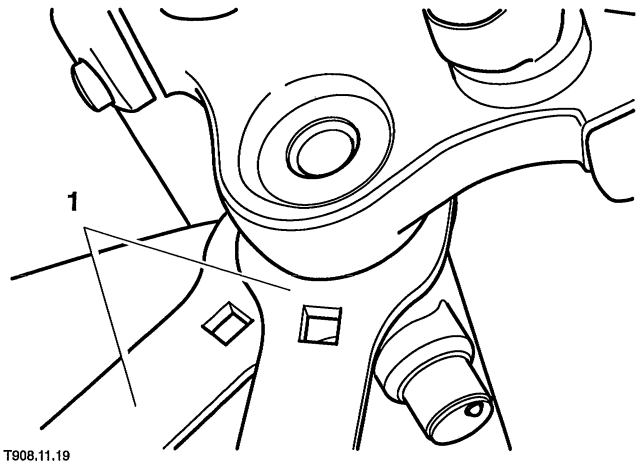
NOTE:

- **Correct adjustment is attained when the bearing play is eliminated without preloading the bearings.**

6. With the bearing freeplay correctly set, hold the adjuster nut stationary then tighten the locknut to **40 Nm** using tools 3880140-T0301.

NOTE:

- **Ensure the adjuster nut does not move as the locknut is tightened.**



1. Tools 3880140-T0301

7. Seat the top yoke assembly in position then refit the washer and steering stem top nut, tightening it to:

- All models except Thruxton - **65 Nm**
- Thruxton - **90 Nm**

8. Tighten the top yoke clamp bolts to **27 Nm** (Bonneville, Bonneville T100, Scrambler & Thruxton) and **20 Nm** (America & Speedmaster).

9. On Thruxton, secure the handlebars to the upper yoke with the handlebar locating bolts, tighten the bolts to **11 Nm** then tighten the handlebar clamp bolts to **27 Nm.**

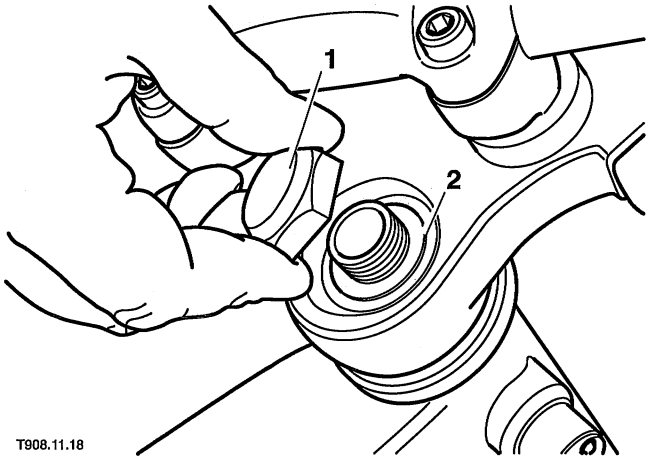
10. Check that the freeplay has been eliminated, and that the steering can be turned freely from lock to lock without any sign of tightness. Re-adjust if necessary.

STEERING STEM/BOTTOM YOKE

Removal - Bonneville, Bonneville T100, Scramler & Thruxton

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove both forks as described elsewhere in this section.
2. Remove the fuel tank as described in the fuel section.
3. Slacken and remove the top nut and washer from the steering stem. Lift off the handlebar/top yoke assembly and position it clear.



1. Top nut

2. Washer

4. Unscrew the bolts and position the regulator/rectifier (and indicators on Thruxton models) clear of the bottom yoke.
5. Unscrew the bolt securing the brake hose clamp to the bottom yoke.
6. Unscrew the locknut from the steering stem.
7. Support the bottom yoke then remove the adjuster nut and dust seal from the steering stem.
8. Lower the steering stem/bottom yoke out of position.
9. Remove the upper bearing and inner race from the frame.

NOTE:

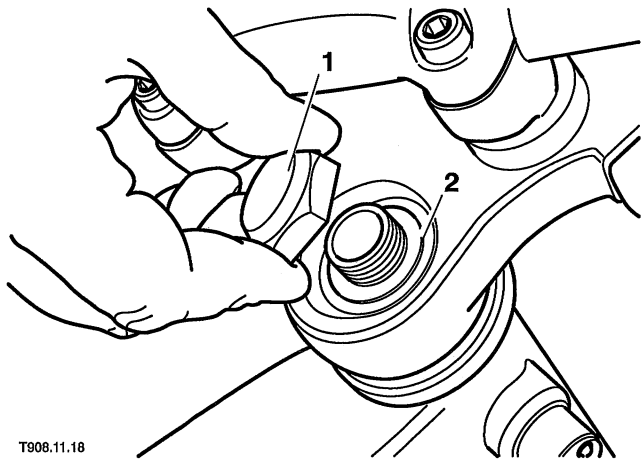
- **Do not attempt to remove the bearing races unless they are to be renewed.**

STEERING STEM/BOTTOM YOKE

Removal - America & Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

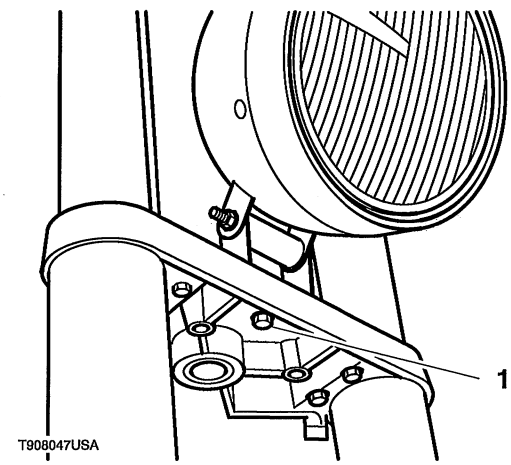
1. Remove both forks as described elsewhere in this section.
2. Remove the fuel tank as described in the fuel section.
3. Slacken and remove the top nut and washer from the steering stem. Lift off the handlebar/top yoke assembly and position it clear.



1. Top nut

2. Washer

4. Release the fixing securing the headlight to the lower yoke. Detach the headlight assembly and place to one side.



1. America & Speedmaster headlight mounting fixing

5. Unscrew the bolts and position the regulator/rectifier clear of the bottom yoke.

6. Unscrew the bolt securing the brake hose clamp to the bottom yoke.

7. Unscrew the locknut from the steering stem.

8. Support the bottom yoke then remove the adjuster nut and dust seal from the steering stem.

9. Lower the steering stem/bottom yoke out of position.

10. Remove the upper bearing and inner race from the frame.

NOTE:

- **Do not attempt to remove the bearing races unless they are to be renewed.**

Inspection - all models

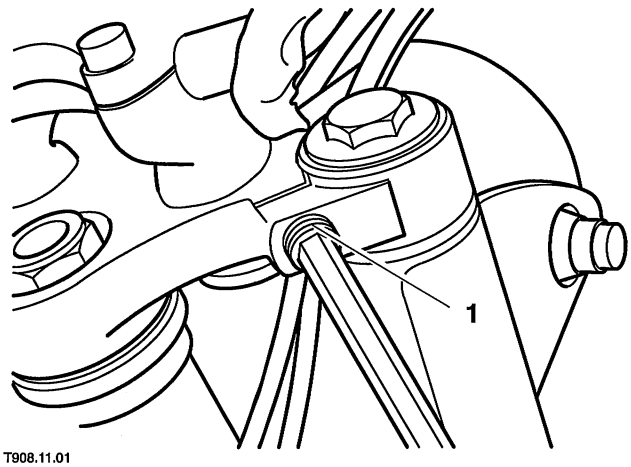
1. Remove all traces of grease and check the bearings and races for signs of wear or damage. Renew both bearings and the dust seals if damage or wear is found.

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Lubricate the bearings and races with fresh grease (Mobil HP222). Work the grease well into the bearings and smear the steering stem with grease.
2. Insert the steering stem into the headstock.
3. Fit the upper bearing, inner race and dust seal and screw on the adjuster nut.
4. Hand-tighten the adjuster nut then fit the locknut.
5. Adjust the steering head bearing freeplay then tighten the locknut to **40 Nm.**
6. Fit the regulator/rectifier and brake hose clamp (and indicators on Thruxton models) to the bottom yoke.
7. Ensure the headlight assembly is correctly positioned before installing the front forks.
8. On Thruxton only, position the handlebars on the forks.
9. Locate the top yoke assembly on the steering stem. Fit the washer and hand-tighten the top nut.
10. Tighten the steering stem top nut to:

    Bonneville/T100 & Scrambler - 65 Nm.

    Thruxton - 90 Nm.
11. On Thruxton only, secure the handlebars to the upper yoke with the handlebar locating bolts, tighten the bolts to **11 Nm** then tighten the handlebar clamp bolts to **27 Nm.**
12. Tighten the top yoke clamp bolt to **27 Nm.**



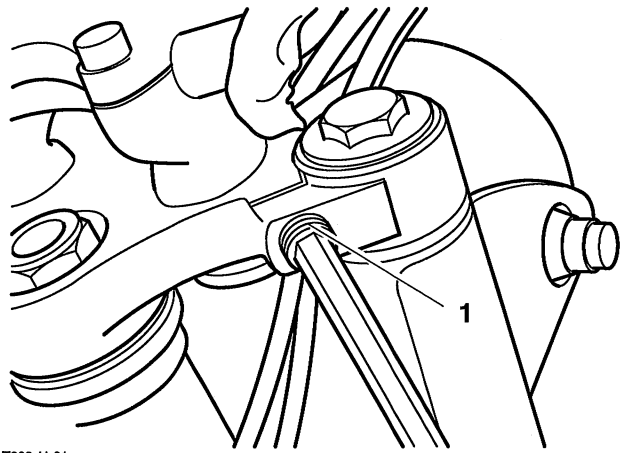
T908.11.01

1. Top yoke clamp bolt

13. Ensure all fasteners are correctly tightened then install the fuel tank.

Installation - America & Speedmaster

1. Lubricate the bearings and races with fresh grease (Mobil HP222). Work the grease well into the bearings and smear the steering stem with grease.
2. Insert the steering stem into the headstock.
3. Fit the upper bearing, inner race and dust seal and screw on the adjuster nut.
4. Hand-tighten the adjuster nut then fit the locknut.
5. Adjust the steering head bearing freeplay then tighten the locknut to **40 Nm.**
6. Refit the headlight assembly to the lower yoke and tighten the bracket fixing to **27 Nm.**
7. Install the front forks.
8. Locate the top yoke assembly on the steering stem. Fit the washer and hand-tighten the top nut.
9. Tighten the steering stem top nut to **65 Nm**
10. Tighten the top yoke clamp bolt to **20 Nm.**



T908.11.01

1. Top yoke clamp bolt

11. Ensure all fasteners are correctly tightened then install the fuel tank.

REAR SUSPENSION

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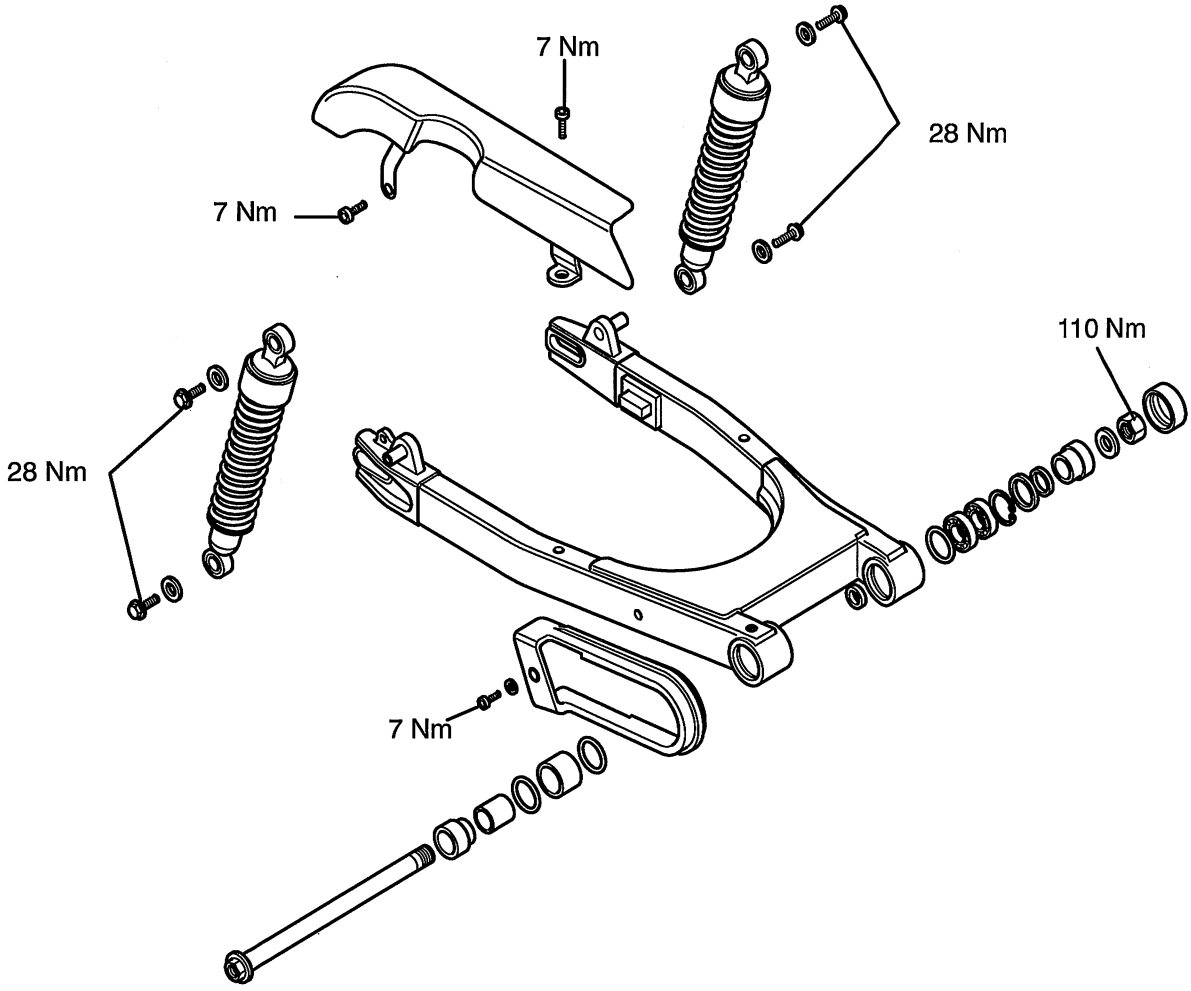
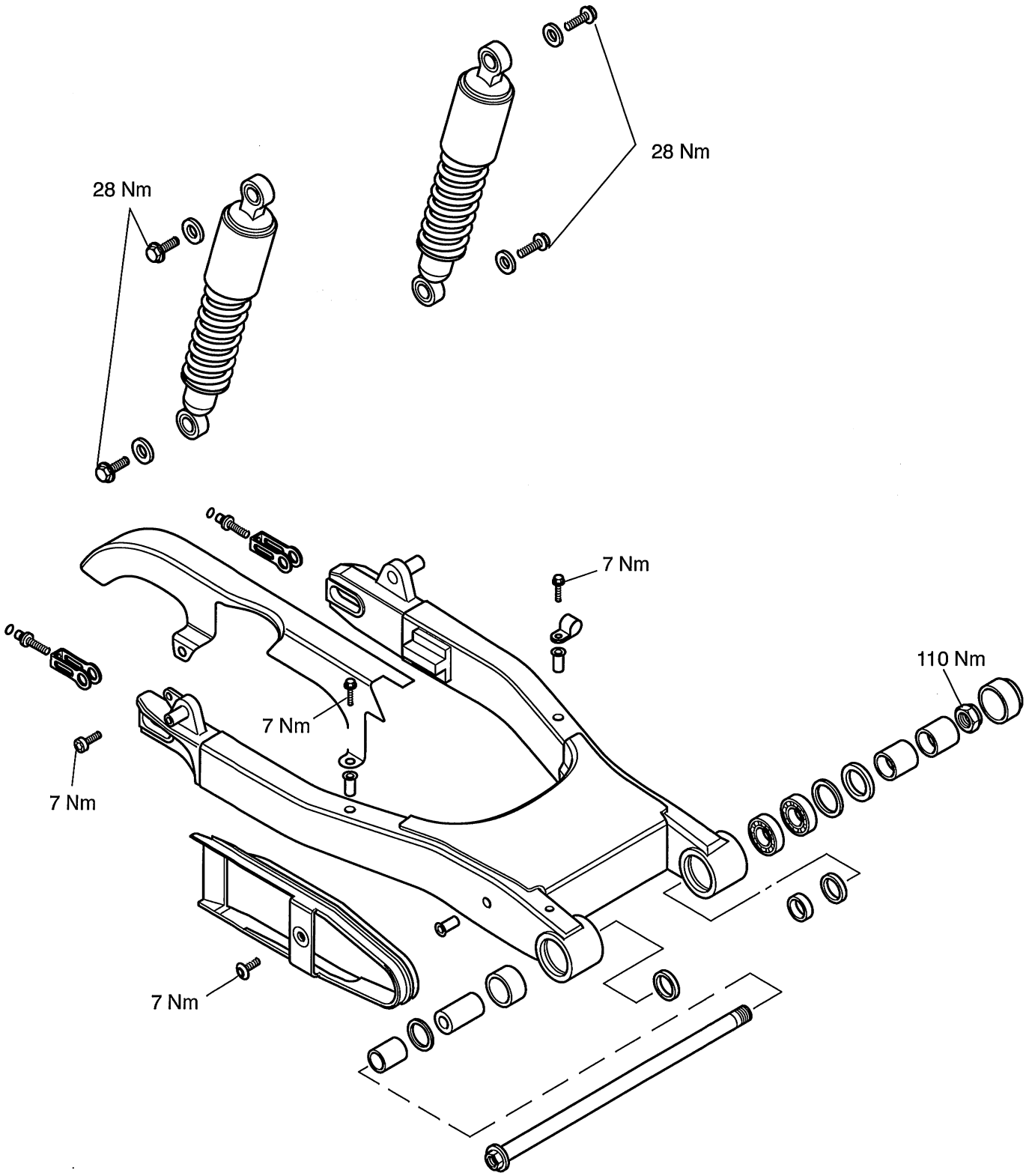
Exploded View
Swinging Arm and Rear Suspension - Bonneville, Bonneville T100, Scrambler & Thruxton



Exploded View
Swinging Arm and Rear Suspension - America & Speedmaster



REAR SUSPENSION UNIT

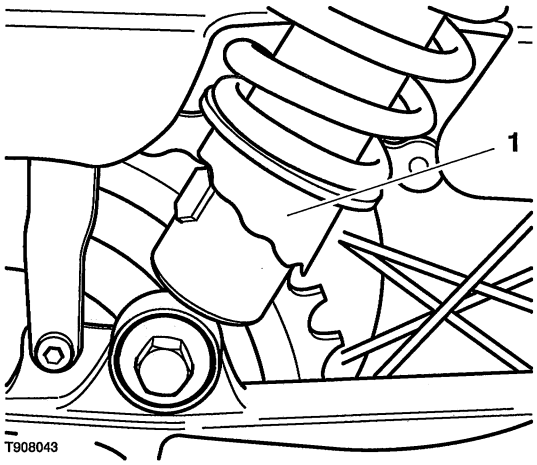
Adjustment

1. The spring preload settings on the rear suspension units are adjustable. Each unit has a five-position adjuster collar fitted to the lower end of the spring.

2. Set both rear suspension unit adjuster collars to the required position. Recommended settings are as follows.

Loading	Adjuster position
Solo riding - softer	1
Solo riding - standard	2
Solo riding - firmer	3
Rider and passenger	4 or 5

WARNING: Ensure both rear suspension unit preload adjusters are set to the same setting. If the spring preload is not equally adjusted, the handling of the motorcycle will be adversely affected which could lead to loss of control, resulting in an accident.



1. Rear suspension preload adjuster

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

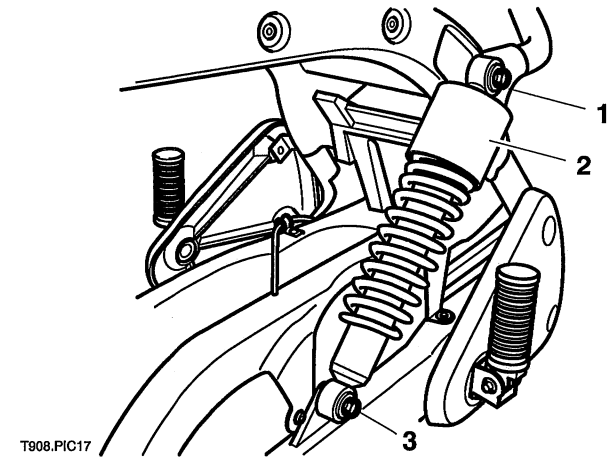
1. Support the motorcycle so that the rear wheel is clear of the ground with no weight on the swinging arm/suspension units. Each rear suspension unit can be removed as follows.

NOTE:

- **If both suspension units are to be removed, place a block beneath the rear wheel to prevent it dropping when the second unit is removed.**

2. On Thruxton only, remove the silencers as described in the Fuel/Exhaust section.

3. Remove the upper and lower mounting bolts and washers, discard the bolts. Remove the suspension unit.



1. Upper mounting bolts

2. Rear suspension unit

3. Lower mounting bolts

NOTE:

- **The rear suspension units are each located on a spigot at their upper and lower mounting points.**

4. Repeat operations 1 to 3 for the other rear suspension unit (if required).

Inspection

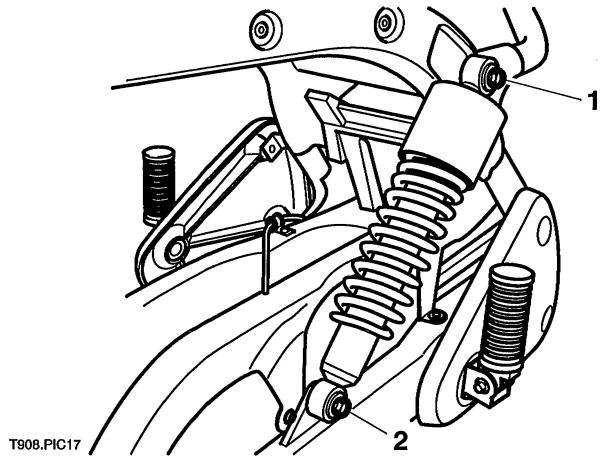
1. Remove all traces of dirt and inspect for damage/wear to the mountings and spring.

2. Inspect the unit closely for fluid leaks from all parts of the unit. If there is any damage, or any leaks are evident, both rear suspension units must be renewed as a matched pair.

WARNING: Always renew both rear suspension units as a pair, even if only one appears to be faulty. If only one suspension unit is replaced, the handling of the motorcycle could be adversely affected. This could result in an unsafe riding condition leading to a loss of control and an accident.

Installation

1. Locate the suspension unit on its mountings adjusting the swinging arm position if necessary to locate the upper and lower mountings.



1. Upper mounting point

2. Lower mounting point

2. Secure the rear suspension unit with the washers and **new** mounting bolts. Tighten the bolts to **28 Nm.**

3. On Thruxton only, refit the silencers as described in the Fuel/Exhaust section.

4. Repeat operations 1 to 3 for the other rear suspension unit (if removed).

5. Remove the wheel support block.

SWINGING ARM - BONNEVILLE, BONNEVILLE T100, SCRAMBLER & THRUXTON

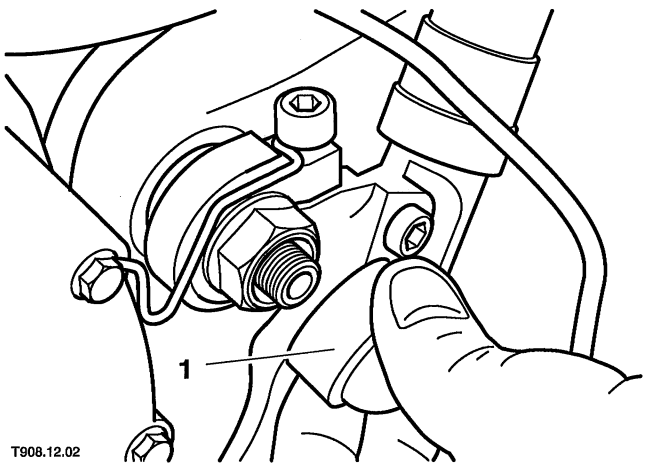
Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle so that the rear wheel is clear of the ground with no weight on the swinging arm/suspension units.
2. Disconnect the battery, negative (black) lead first.
3. Remove the rear wheel.

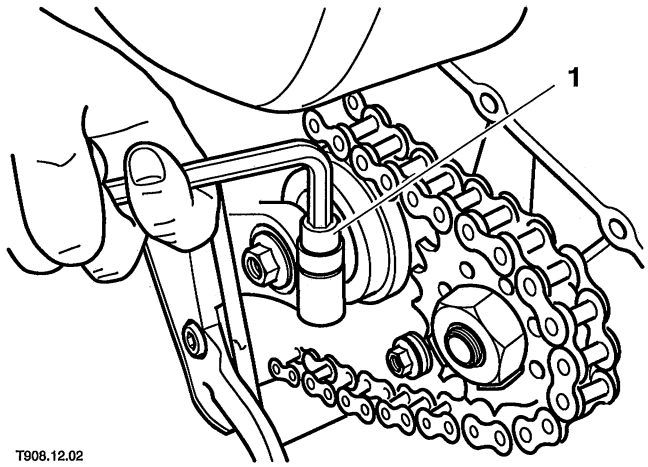
CAUTION: With the wheel removed, support the drive chain to prevent it from falling to the floor and picking up debris and other abrasive material which would accelerate chain wear leading to premature replacement.

4. On Thruxton, remove the silencers as described in the Fuel section.
5. Unscrew the bolts and remove the sprocket cover from the engine.
6. Undo the screws and remove the chainguard.
7. Undo the screw and free the rear brake hose clamp from the swinging arm.
8. Remove the cap from the left end of the swinging arm pivot bolt.



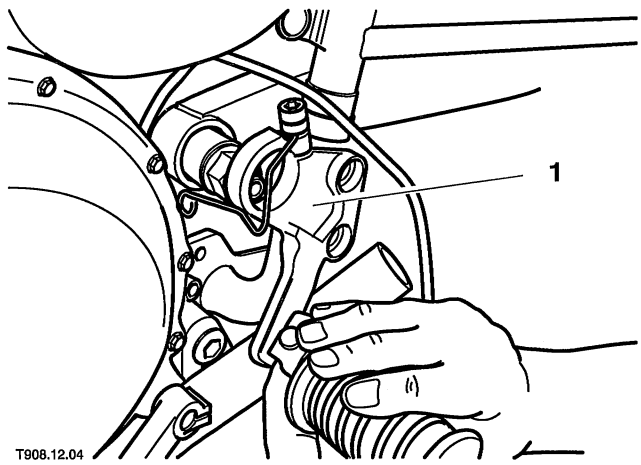
1. Cap

9. On Thruxton only, note the position of the gearchange lever. Undo the pinch bolt and remove the lever from the gearchange shaft.
10. Remove the caps and slacken the swinging arm outrigger clamp bolts on the left and right side rider footrest brackets.



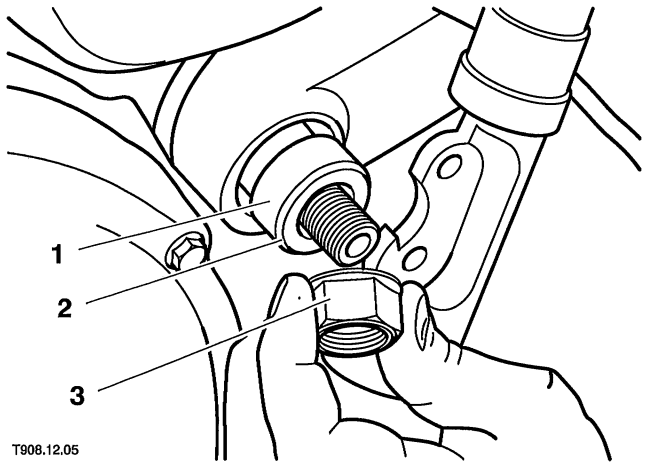
1. Outrigger clamp bolt

11. Unscrew the mounting bolts and remove the left side control plate.



1. Control plate

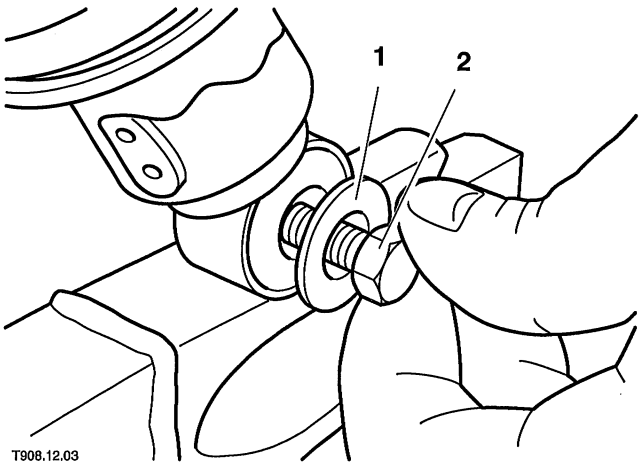
12. Unscrew the nut from the swinging arm pivot bolt and slide off the washer and left side outrigger bush.



1. Outrigger bush

2. Washer

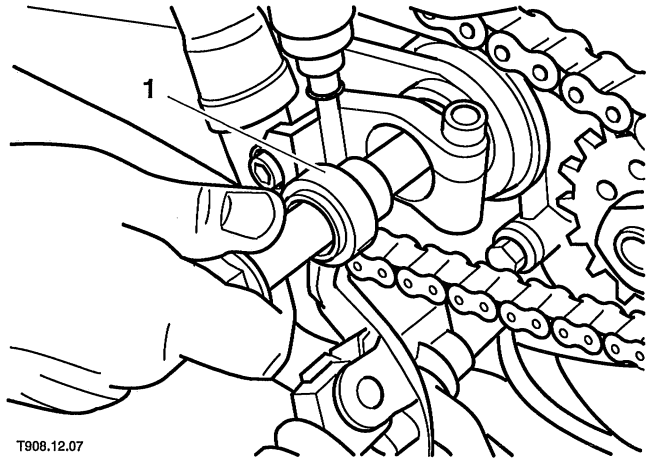
13. Unscrew the left and right rear suspension unit lower mounting bolts and washers and free the units from the swinging arm. Discard the bolts.



1. Washer

2. Mounting bolt

14. Withdraw the pivot bolt together with the outrigger bush.



1. Outrigger bush

15. Manoeuvre the swinging arm assembly away from the motorcycle. Take care not to lose the spacers from the left pivot.

Inspection

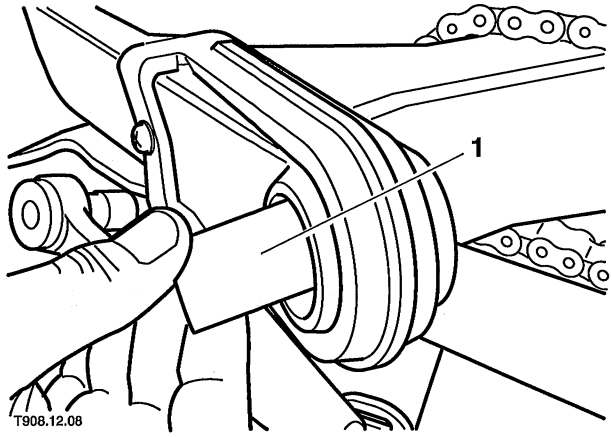
1. Slide out the inner sleeve from the swinging arm right pivot and remove the inner and outer spacers from the left pivot.

2. Check the right pivot dust seals, inner sleeve and needle roller bearing for signs of wear or damage. Renew all components if worn.

3. Check the left pivot dust seals and bearings for wear or damage. Renew all components if worn.

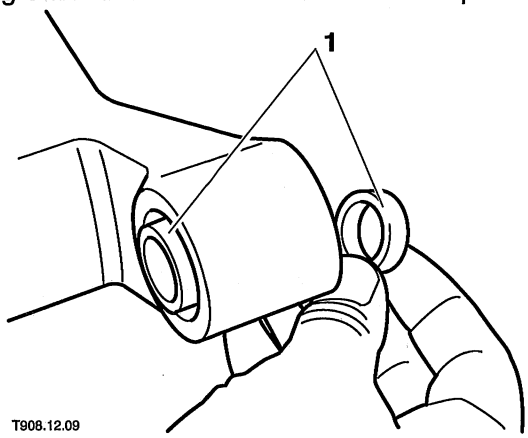
Installation

1. Remove all traces of grease from the right pivot. Lubricate the bearing and inner sleeve with fresh grease (Mobil HP222) then insert the sleeve.



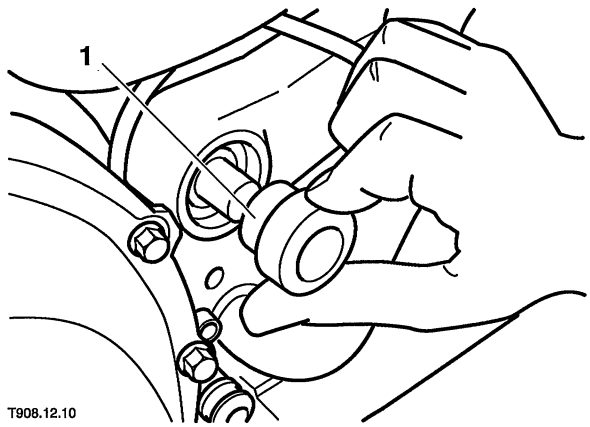
1. Inner sleeve

2. Lubricate the left pivot dust seal lips with a smear of grease and insert the inner and outer spacer.



1. Spacers

3. Manoeuvre the swinging arm assembly into position and locate it on the rear of the crankcase.
4. Ensure the spacers are all correctly positioned then insert the pivot bolt and outrigger bush from the right-hand side.
5. Slide the left outrigger bush onto the pivot bolt then fit the washer and nut.



1. Outrigger bush

6. Locate the rear suspension units on the swinging arm and fit their washers and **new** mounting bolts. Tighten the bolts to **28 Nm**.
7. Refit the left side outrigger and tighten the mounting bolts to **45 Nm**.
8. Tighten the swinging arm pivot bolt to **110 Nm**.
9. Tighten the left and right side swinging arm outrigger clamp bolts to **45 Nm** then fit the caps.
10. Fit the cap to the left end of the swinging arm pivot bolt.
11. On Thruxton only, refit the gearchange lever in the position noted prior to removal. Tighten the pinch bolt to **9 Nm.**
12. Install the sprocket cover, tightening the cover bolts to **9 Nm**.
13. Refit the chainguard and brake hose clamp to the swinging arm.
14. On Thruxton only, refit the silencers as described in the Fuel/Exhaust section.
15. Refit the rear wheel.
16. Secure the bike, lower and remove the support and park the bike on the sidestand.
17. Apply the rear brake lever several times to force the pads back into contact with the disc.
18. Check the rear brake fluid level, adjust as necessary.
19. Reconnect the battery, positive (red) lead first.

WARNING: Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

SWINGING ARM - AMERICA & SPEEDMASTER

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle so that the rear wheel is clear of the ground with no weight on the swinging arm/suspension units.

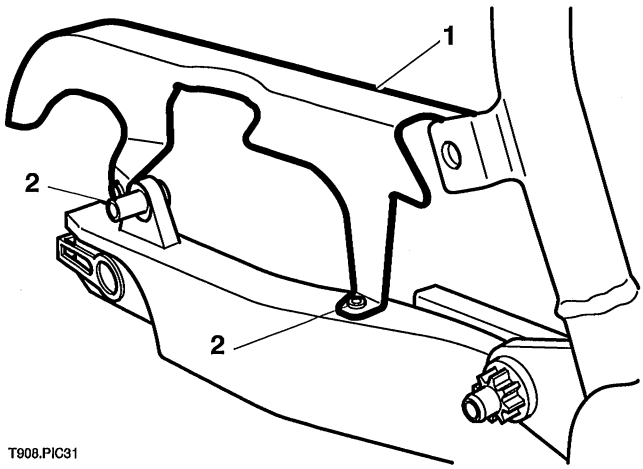
2. Disconnect the battery negative (black) lead first, then remove the battery box from the frame.

3. Remove the rear wheel as described in the wheel section.

CAUTION: With the wheel removed, support the drive chain to prevent it from falling to the floor and picking up debris and other abrasive material which would accelerate chain wear leading to premature replacement.

4. Remove both exhaust silencers as described in the fuel system section.

5. Undo the screws and remove the chainguard.

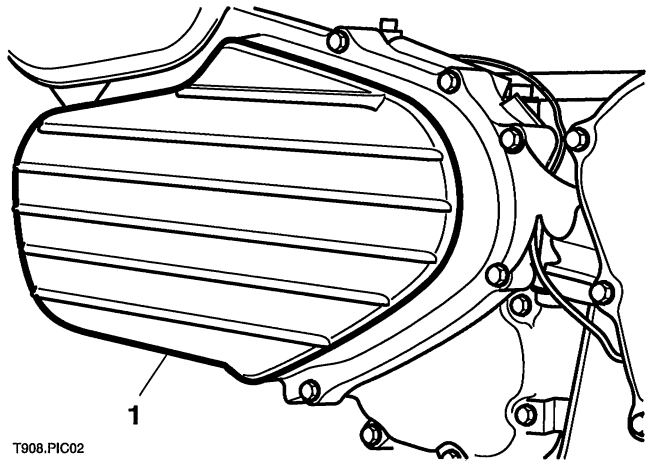


T908.PIC31

1. Chain guard

2. Chain guard fixing locations

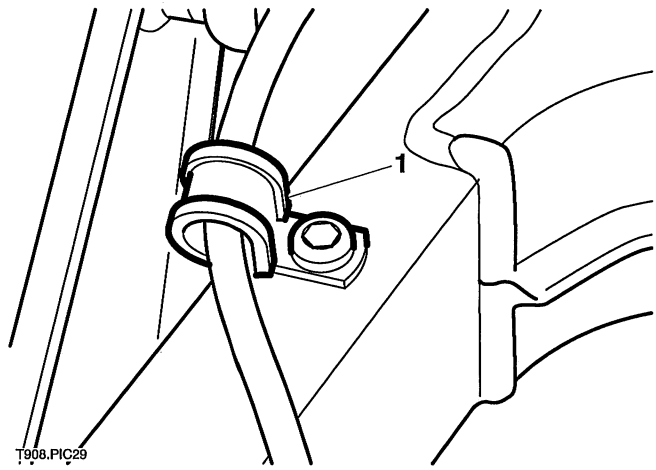
6. Remove the sprocket cover from the engine.



T908.PIC02

1. Sprocket cover

7. Undo the screw and free the rear brake hose clamp from the swinging arm.



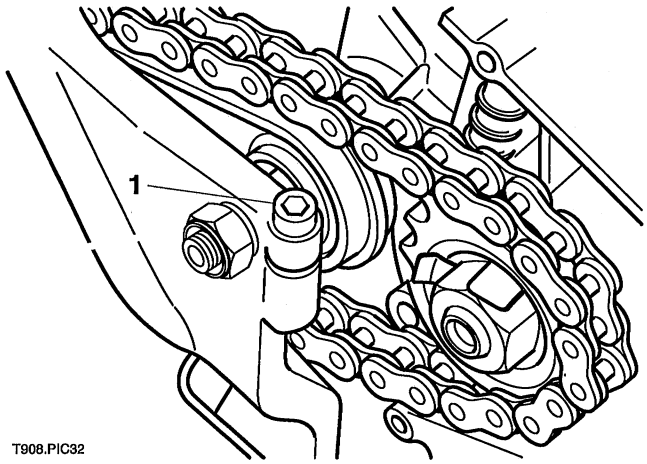
T908.PIC29

1. Brake hose clamp

8. Remove both rear suspension units as described earlier in this section.

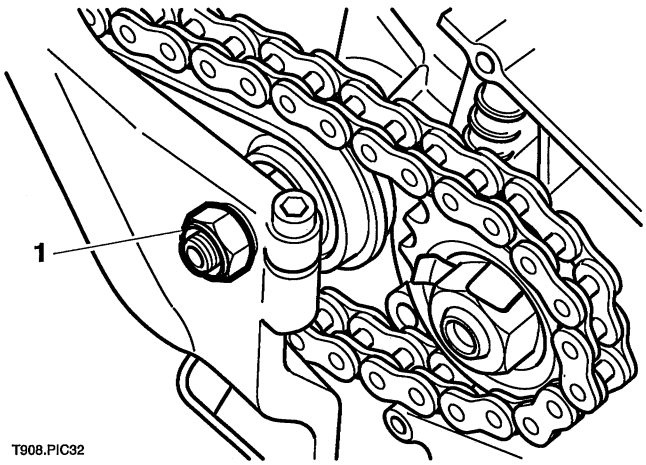
9. Remove the cap from the swinging arm pivot nut.

10. Slacken the swinging arm outrigger clamp bolts on the left and right side of the frame.



1. Outrigger clamp bolt (left hand shown)

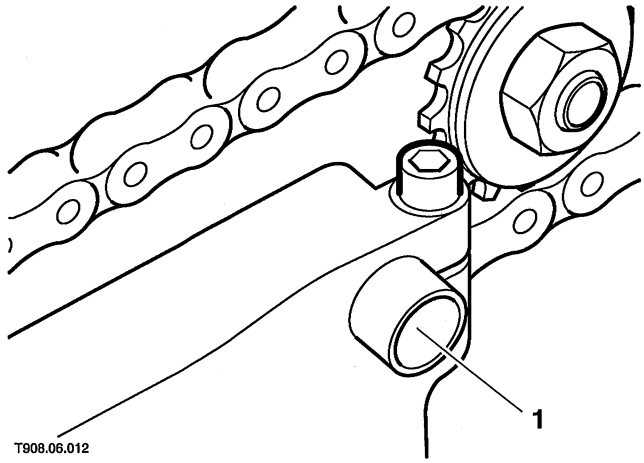
11. Unscrew the nut from the swinging arm pivot bolt.



1. Swinging arm spindle nut

12. Support the swinging arm and remove the spindle bolt.

13. Working from the left hand side, using a soft faced drift, push the right hand frame to swinging arm spacer outwards



1. Spacer

NOTE:

- **It is not necessary to fully dislodge the spacers from the frame, only dislodged the spacers sufficient to remove the swinging arm.**

14. Repeat for the left hand spacer.

15. Remove the arm from the bike in a rearwards direction.

Inspection

1. Check the seals, sleeves and needle roller bearings for signs of wear or damage. Renew all components if worn.

2. Check the spindle and spacers for signs of wear or damage. Renew all components if worn.

Installation

1. Lubricate the needle roller bearings with grease.

2. Thoroughly clean the spindle.

3. Position the arm to the engine and frame and insert the swinging arm spindle from the right hand side of the motorcycle.

4. Fit the nut to the swinging arm spindle and tighten to **110 Nm.**

5. Refit the cap to the nut.

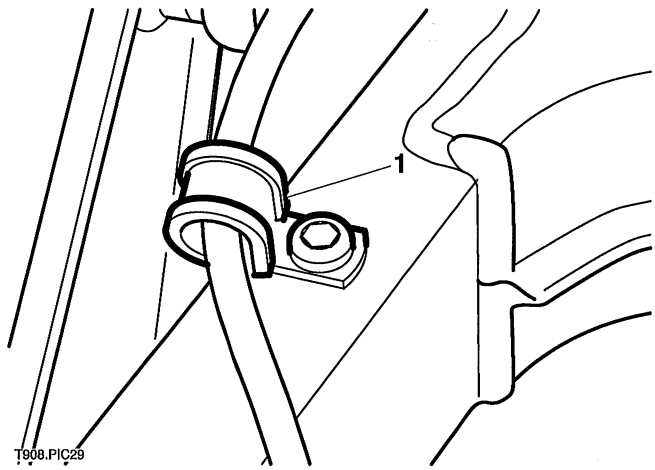
NOTE:

- **Ensure that the swinging arm spacers are drawn evenly through the frame towards the swinging arm during tightening of the spindle.**

6. Tighten the frame outrigger clamp bolts to **45 Nm.**

7. Refit both rear suspension units as described earlier in this section.

8. Position the rear brake hose clamp to the swinging arm and tighten its screw to **7 Nm.**



1. Brake hose clamp

9. Refit the sprocket cover, tightening the fixings to **9 Nm.**

10. Refit the chainguard, tightening the fixings to **7 Nm.**

11. Refit the battery box to the frame then refit and reconnect the battery, positive (red) lead first.

12. Refit the rear wheel as described in the wheel section.

13. Refit both exhaust silencers as described in the fuel system section.

14. Secure the bike, lower and remove the support and park the bike on the sidestand.

15. Apply the rear brake lever several times to force the pads back into contact with the disc.

16. Check the rear brake fluid level, adjust as necessary.

WARNING: Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

FINAL DRIVE

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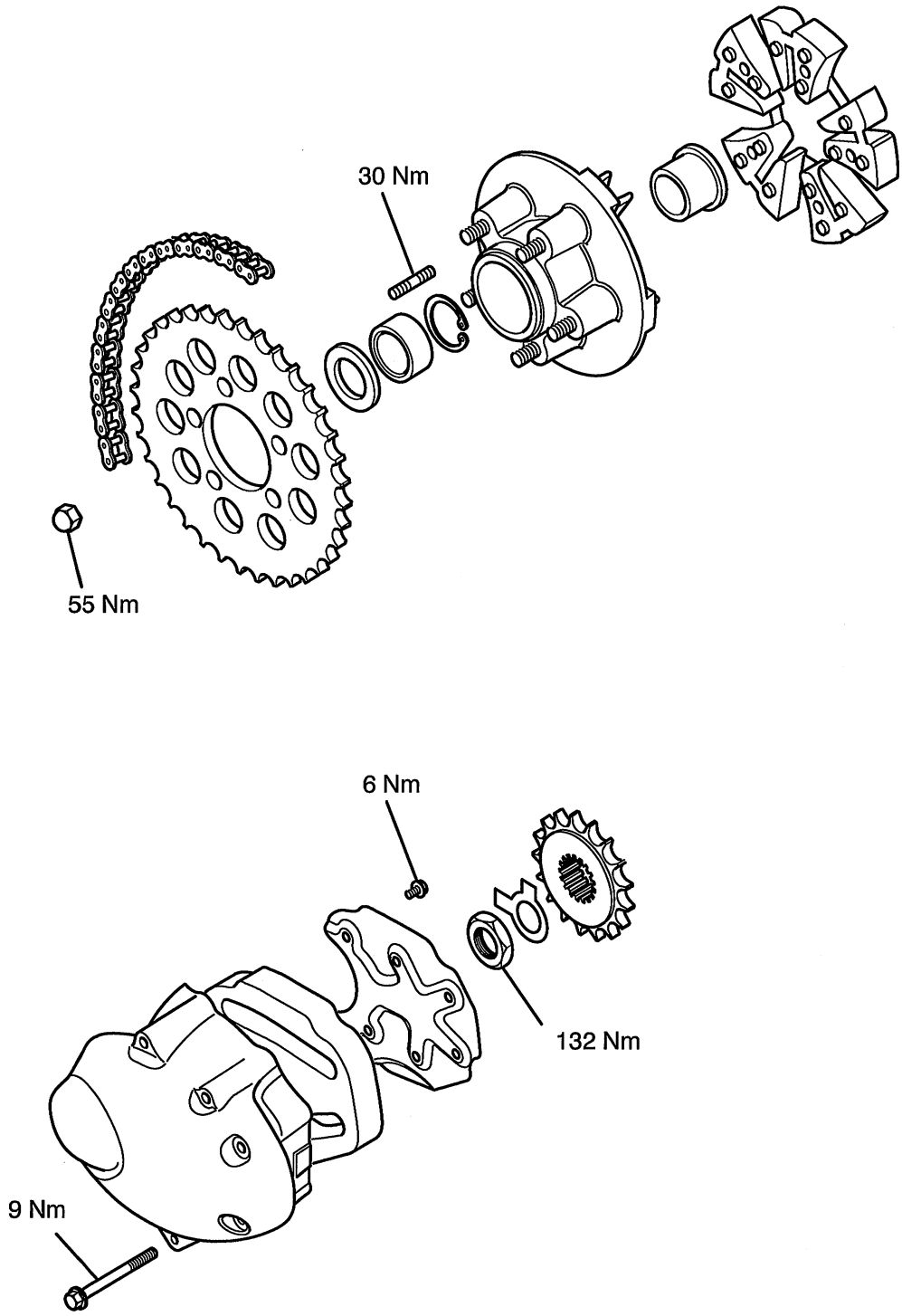
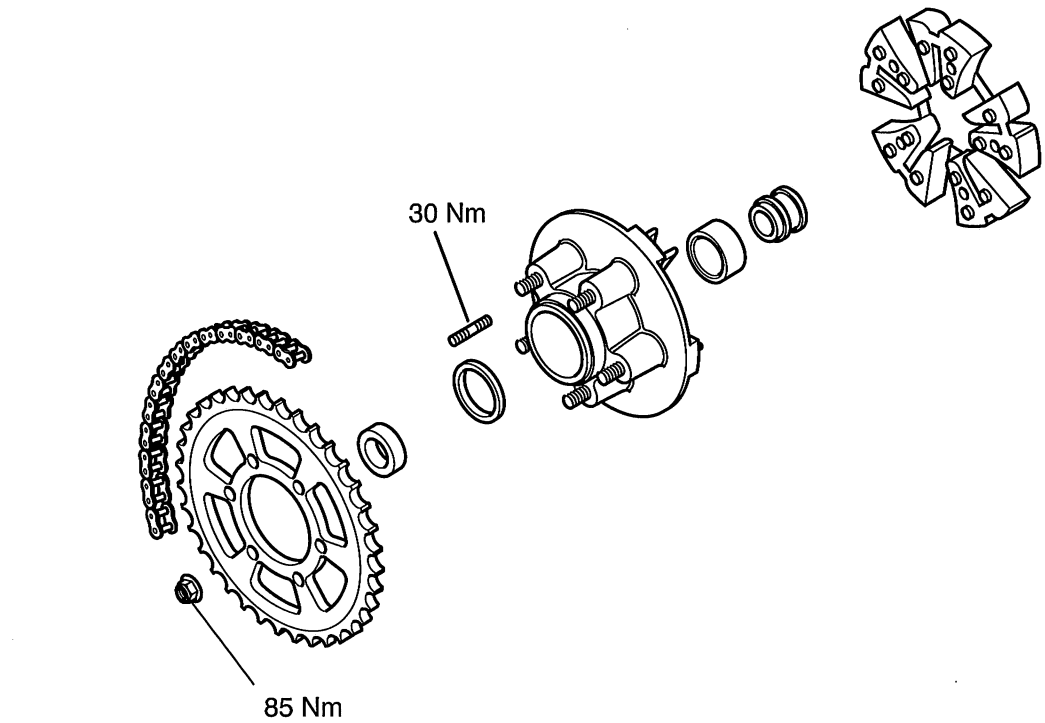
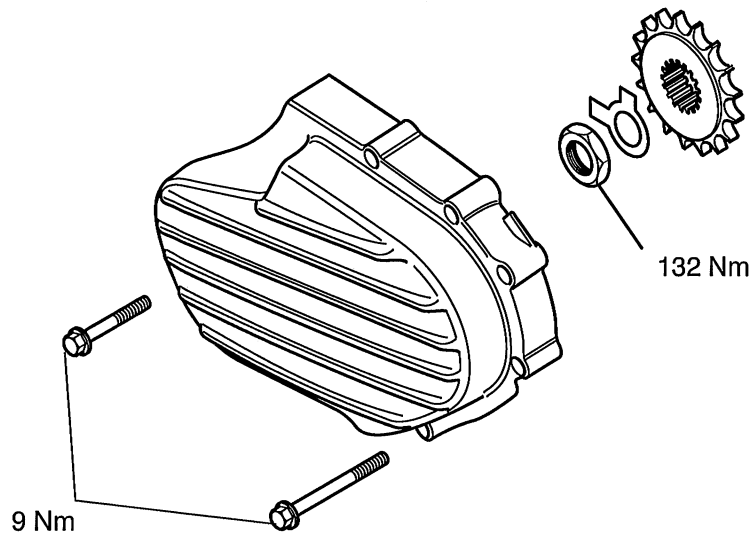
Exploded View
Final Drive - Bonneville, Bonneville T100, Scrambler & Thruxton



Exploded View
Final Drive - America & Speedmaster





DRIVE CHAIN FREEPLAY CHECK , ADJUSTMENT AND LUBRICATION

Freeplay check - all models

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Rotate the rear wheel to find the position where the chain has least slack.

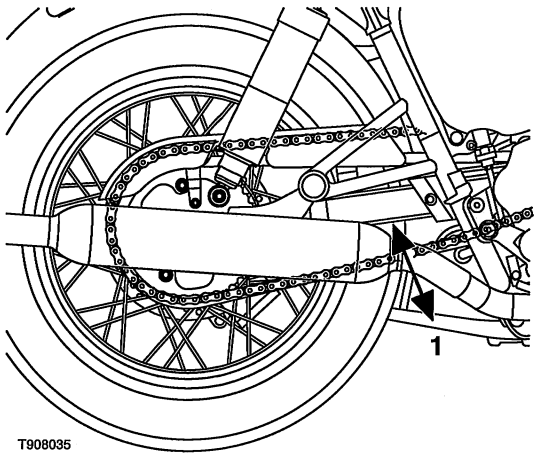
NOTE:

- **Always check/adjust the drive chain freeplay at the point where the chain has least slack.**

2. Position the motorcycle on the side stand and measure the chain's vertical movement, mid-way between sprockets.

3. If correct, the vertical movement of the drive chain midway between the sprockets should be:

   - 25-35mm - Bonneville, Bonneville T100, Scrambler & Thruxton
   - 20-30 mm - America & Speedmaster



1. Drive chain freeplay measurement point

Adjustment

1. Rotate the rear wheel to find the position where the chain has least slack.

NOTE:

- **Always check/adjust the drive chain freeplay at the point where the chain has least slack.**

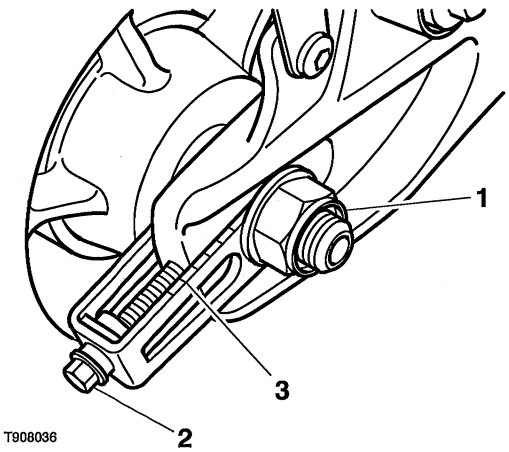
2. Position the motorcycle on the side stand.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

3. Slacken the rear wheel spindle nut.

4. Adjust the drive chain freeplay by rotating the adjuster bolts. Rotate the bolts clockwise to increase chain freeplay and anti-clockwise to reduce freeplay. **Use the alignment marks on the adjusters to ensure equal adjustment and keep the adjusters in firm contact with the bolt shoulders during adjustment.**

WARNING: If the adjusters are not equally set, the wheel alignment will be incorrect. This will adversely affect the handling of the motorcycle which could result in an unsafe riding condition, leading to a loss of control and an accident.



1. Wheel spindle nut

2. Adjuster

3. Alignment mark

5. When the freeplay is correctly set, tighten the rear wheel spindle nut to **85 Nm**.

6. Rotate the rear wheel and recheck the freeplay. Readjust if necessary.

7. On completion, rotate the adjuster bolts anti-clockwise until their shoulders are in firm contact with the adjusters.

Lubrication

1. If the chain is especially dirty, clean it using a degreaser before applying the lubricant.

> ⚠ **CAUTION: Never use a power wash system to clean the chain as this may cause damage to the chain components.**

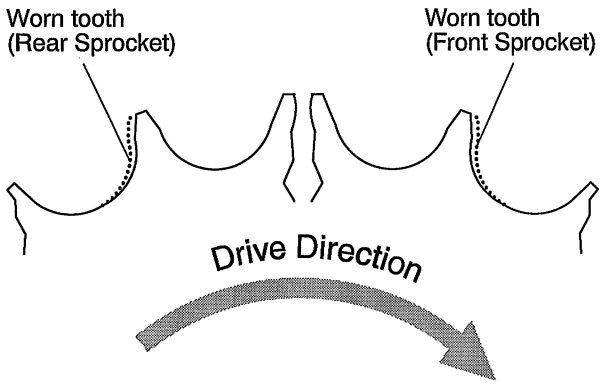
2. Apply chain lubricant to the sides of the chain rollers, and also the seals. The lubricant will penetrate the rollers and bushes and will help prevent the seals from deteriorating.

3. Wipe off any excess oil.

DRIVE CHAIN AND SPROCKET WEAR CHECK

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Position the motorcycle on the side stand.
2. Undo the screws and remove the chainguard from the swinging arm.
3. Unscrew the bolts and remove the sprocket cover from the engine.
4. Examine the whole length of the chain. If there are any excessively tight or loose sections, loose pins or damaged rollers, the chain and sprockets should be renewed.
5. Inspect sprockets for unevenly or excessively worn teeth. Also examine the sprockets for damaged teeth.

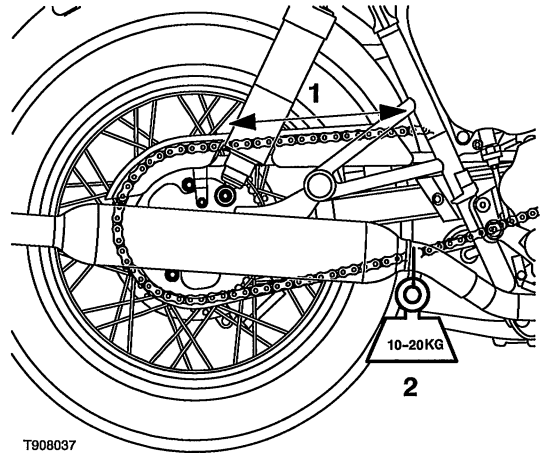


10.12-1

NOTE:

- **Sprocket wear is exaggerated for illustration purposes.**

6. Stretch the chain taut by hanging a 10-20 kg (20-40 lb) weight from its bottom run.
7. Measure the length of 20 links on the top run of the chain from the centre of the 1st link pin to the centre of the 21st link pin. Repeat the test at various points along the length of the chain (the chain may wear unevenly) and check if any length exceeds the service limit of 321 mm.



T908037

1. Drive chain length measurement point
2. Weight

8. If there is any irregularity found in any of the components, or if the chain has worn beyond the service limit, renew the drive chain and both sprockets as a set.

NOTE:

- **Always renew the drive chain and both sprockets as a set. Never fit a new chain to worn sprockets or new sprockets to a worn chain.**

WARNING: Use only Triumph recommended chain and sprockets as specified in the Triumph Parts Catalogue. The use of non-recommended items could lead to failure. Drive chain failure will cause serious damage to the motorcycle and could lead to loss of control, resulting in an accident.

9. Also check the drive chain slider on the swinging arm for signs of wear or damage. Renew if necessary.
10. Refit the sprocket cover, tightening its bolts to **9 Nm**.
11. Refit the chainguard to the swinging arm, tightening its screws to **7 Nm**.

DRIVE CHAIN REPLACEMENT

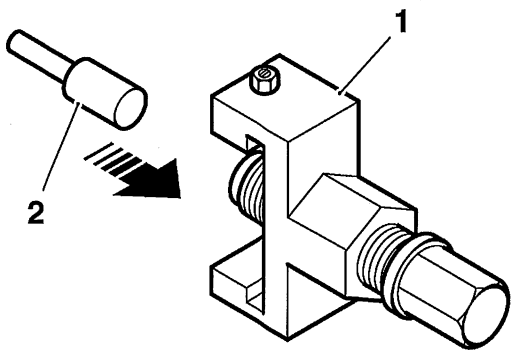
Rivet link type

The following instructions for the replacement of rivet link type drive chains requires the use of service tool A3880205.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle on a stand so the rear wheel is clear of the ground.

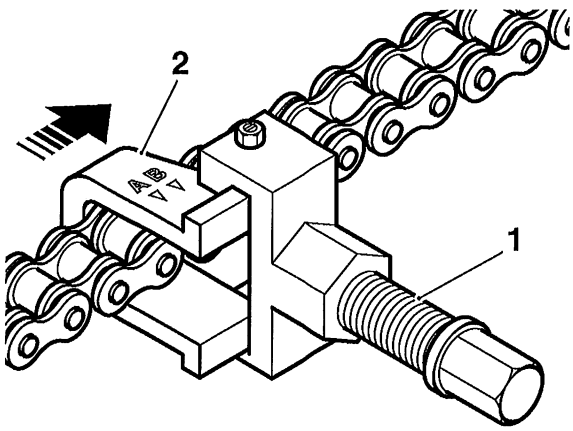
2. Insert the pin into the pin holder so its smaller diameter end (cutting point) is facing away from the holder as shown.



1. Tool body and pin holder
2. Pin

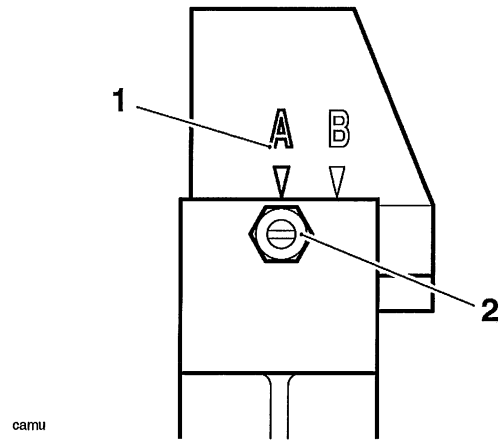
3. Position the 'U' shaped holder behind the chain ensuring its A and B marks are uppermost.

4. Slide the tool body assembly onto the 'U' shaped holder ensuring its adjustment screw is uppermost.



1. Tool body assembly
2. 'U' shaped holder

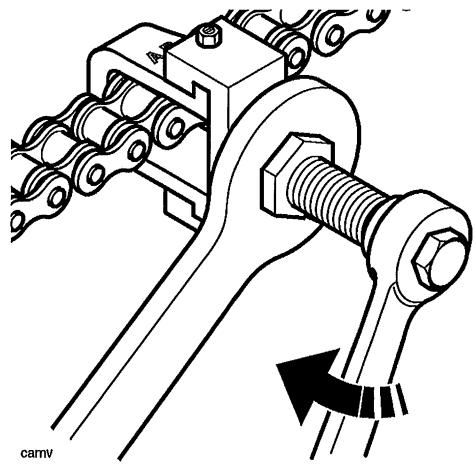
5. Align the A mark on the 'U' shaped holder with the tool body adjustment screw ensuring the adjustment screw spring-loaded ball locates correctly in the holder indent.



1. 'U' shaped holder A mark
2. Tool body adjustment screw and locknut

6. Locate the chain link pin which is to be removed in the hole in the centre of the 'U' shaped holder then screw the pin holder in until its pin contacts the link pin. **Ensure that the holder pin is centralised on the link pin to be removed.**

7. Retain the tool body with a wrench then tighten the pin holder until the link pin is pressed out from the chain.



8. Remove the tool and separate the two ends of the chain.

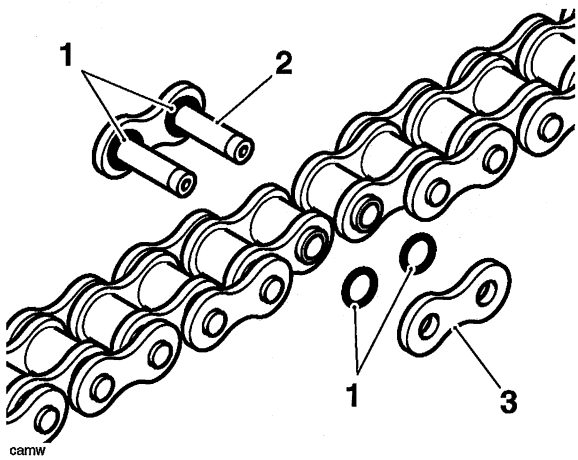
NOTE:
The replacement chain is supplied in a split condition, complete with a link kit to join the two ends.

⚠ CAUTION: The component parts of the new link kit are coated with a special grease which must not be removed. Removal of this special grease will severely reduce the service life of the chain.

9. Use the old drive chain to pull the new chain into position as follows: Temporarily attach the end of the new chain to a free end of the old chain using the old connector link. Carefully pull the other end of the old chain to pull the new chain around the sprockets.

NOTE:
Do not use the new connector link as the special grease on it may be removed.

10. Using the new link supplied with the chain kit, join the two ends of the chain. Ensure that the 'O' rings are positioned as shown below and the link plate is fitted with its markings facing outwards.



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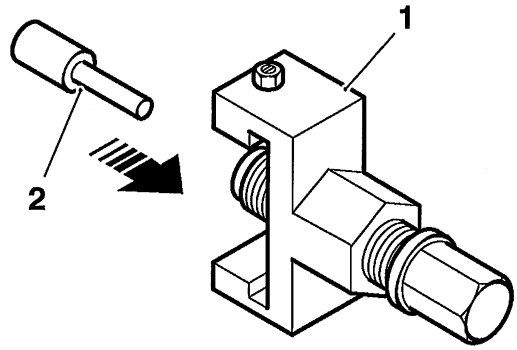
1. 'O' rings

2. Link

3. Link plate

11. Insert the pin into the pin holder so its larger diameter end (riveting point) is facing away from holder as shown.



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1. Tool body and pin holder

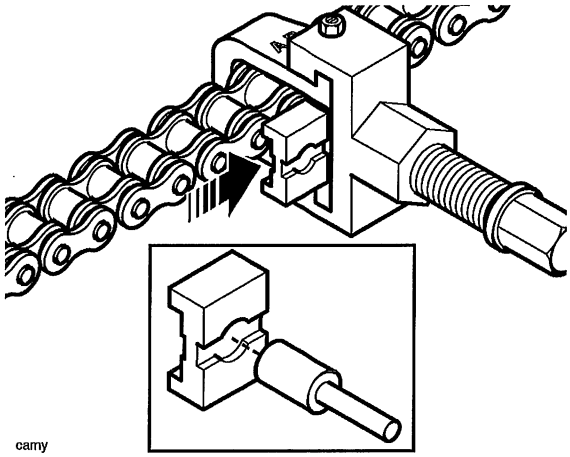
2. Pin

12. Position the 'U' shaped holder behind the chain ensuring its A and B marks are uppermost.

13. Slide the tool body assembly onto the 'U' shaped holder, ensuring its adjustment screw is uppermost.

14. Align the A mark on the U-shaped holder with the tool body adjustment screw ensuring the adjustment screw spring-loaded ball locates correctly in the holder indent (see step 5).

15. Slide the link plate holder into the 'U' shaped holder and locate it on the end of the pin. **Ensure the pin is correctly located in the link plate holder circular cutout.**



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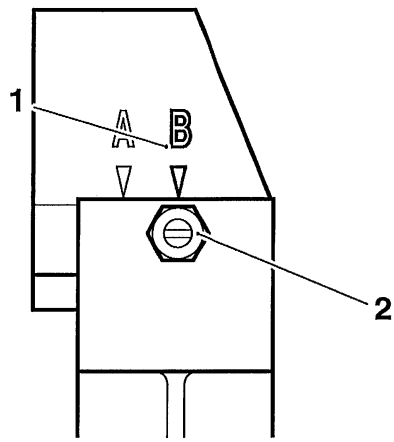
16. Locate both the split link pins in the circular cutouts in the 'U' shaped holder then screw the pin holder in until the plate holder contacts the link plate. **Ensure both the split link and link plate are correctly located in their holders**

17. Retain the tool body with a wrench then tighten the pin holder until the link plate is pressed fully onto the link.

18. Back off the pin holder then slide the tool assembly to one side and check that the split link is correctly assembled.

19. Remove the link plate holder from the tool.

20. Slide the tool body along the 'U' shaped holder until the B mark on the holder is aligned with the adjustment screw. Ensure the adjustment screw spring-loaded ball is correctly located in the holder indent.



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1. 'U' shaped holder B mark

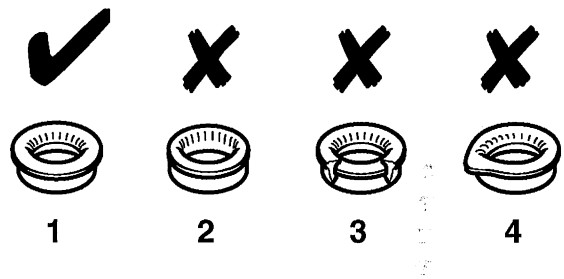
2. Tool body adjustment screw and locknut

21. Locate one of the split link pins in the right-hand circular cutout of the 'U' shaped holder then screw the pin holder in until its pin contacts the split link end. **Ensure the split link pin is centrally located on the holder pin.**

22. Retain the tool body with a wrench then tighten the pin holder until the split link end is riveted-over.

23. Back off the pin holder and rivet the remaining split link pin as described above.

24. Remove the tool from the chain and check that both the split link pins are correctly riveted as shown below.



cana

1. Correct riveting

2. Insufficient riveting

3. Excessive riveting

4. Riveting off-centre.

WARNING: If either split link pin is not correctly riveted, the split link must be removed and replaced with a new link. Never operate the motorcycle with an incorrectly riveted split link as the link could fail resulting in an unsafe riding condition leading to loss of control and an accident.

Endless type

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

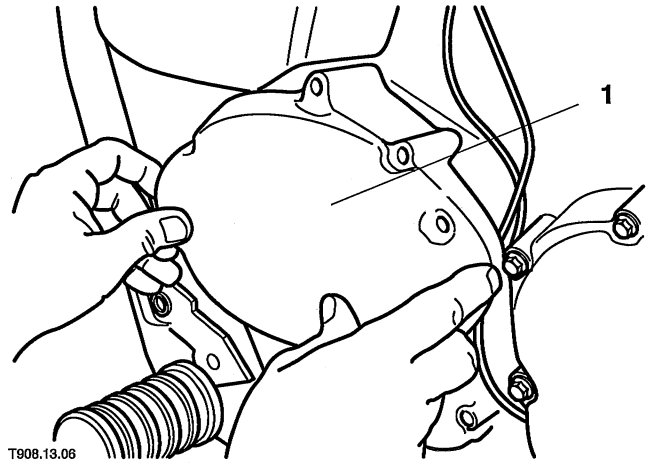
1. Remove the swinging arm (see rear suspension section).
2. Free the chain from the front sprocket and remove it from the motorcycle.
3. Locate the new chain on the front sprocket.
4. Install the swinging arm (see rear suspension section).

FRONT SPROCKET

Removal

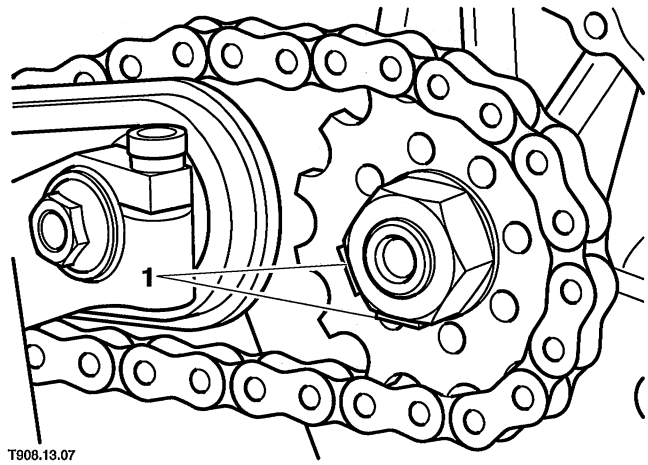
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Position the motorcycle on the side stand.
2. Unscrew the bolts and remove the sprocket cover from the engine.



1. Sprocket cover (Bonneville illustrated)

3. Bend back the tabs of the front sprocket lockwasher.



1. Lockwasher tabs

4. Have an assistant apply the rear brake hard, then loosen the sprocket nut.

NOTE:

- **If necessary, place the transmission in gear to help prevent rear wheel rotation.**

5. Remove the sprocket nut and discard its lockwasher.

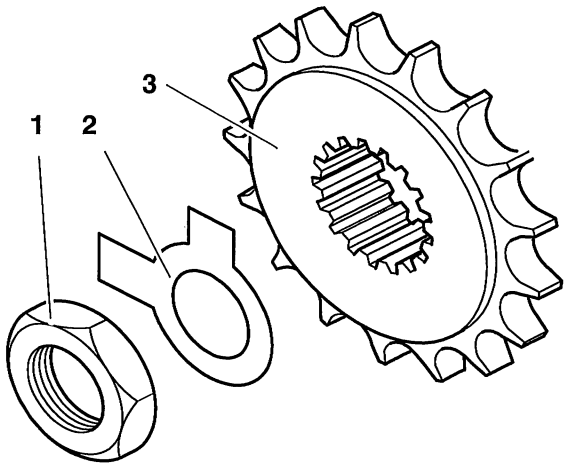
6. Set the drive chain adjustment to allow maximum freeplay in the chain.

7. Disengage the front sprocket from the chain and slide it off the output shaft, noting which way around it is fitted.

Installation

1. Fit the front sprocket, ensuring it is the correct way around, and engage it with the drive chain.

2. Fit a **new** lockwasher, engaging it with the output shaft splines, and fit the sprocket nut hand-tight.



1. Nut

2. Lockwasher

3. Sprocket

3. Have an assistant apply the rear brake hard, then tighten the front sprocket nut to **132 Nm**.

NOTE:

- **If necessary, place the transmission in gear to help prevent rear wheel rotation.**

4. Adjust the drive chain freeplay.

5. Secure the sprocket nut in position by bending down the lockwasher tabs so they firmly contact the nut flats.

6. Fit the sprocket cover and tighten its bolts to **9 Nm**.

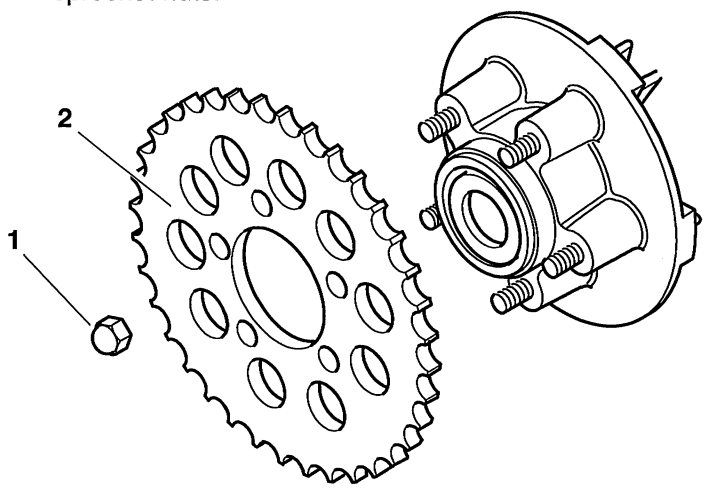
REAR SPROCKET

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the rear wheel.

2. Evenly and progressively slacken and remove the sprocket nuts.



1. Nut

2. Sprocket

3. Remove the sprocket from its carrier, noting which way around it is fitted.

Installation

1. **Replace** any sprocket stud which is loose, tightening the new stud to **30 Nm**.

2. Fit the rear sprocket, ensuring it is the correct way around.

3. Fit the sprocket nuts and evenly and progressively tighten them to **55 Nm** (Bonneville, Bonneville T100, Scrambler & Thruxton) or **85 Nm** (America & Speedmaster).

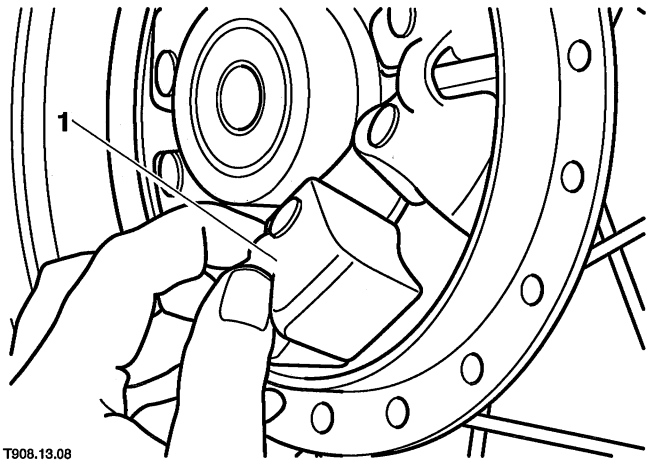
4. Refit the rear wheel.

REAR SPROCKET CARRIER AND CUSH DRIVE

Removal

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the rear wheel.
2. Remove the sprocket carrier from the wheel, along with its spacer.
3. Remove the cush drive rubbers from the wheel hub.



1. Cush drive rubber

Inspection

1. Inspect all components for signs of wear or damage, paying particular attention to the cush drive rubbers. Renew as necessary.

Installation

1. Fit the cush drive to the rear wheel.
2. Ensure the spacer is correctly fitted to the inside of the bearing then fit the sprocket carrier assembly to the rear wheel.
3. Refit the rear wheel.

WHEELS & TYRES

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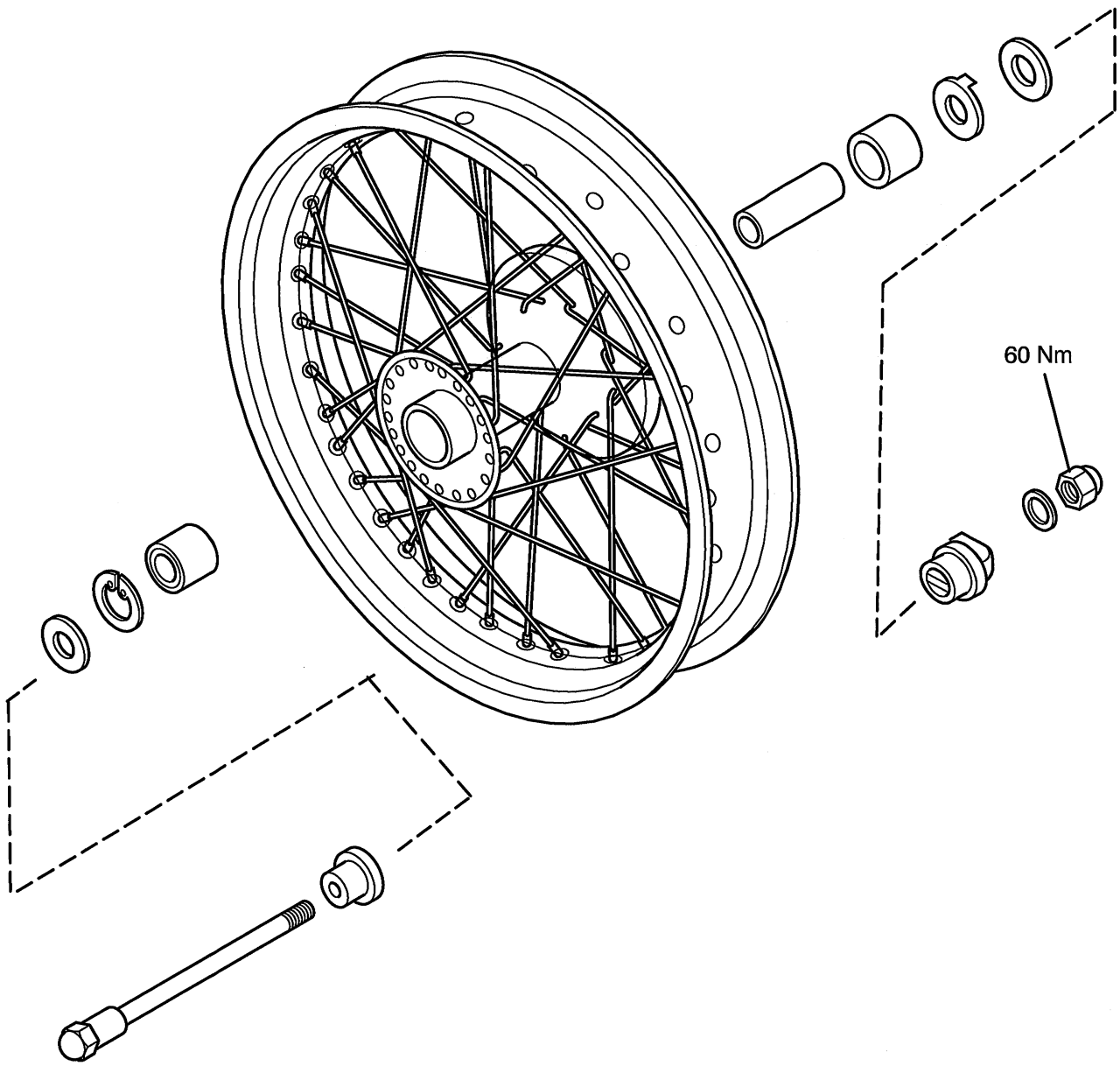
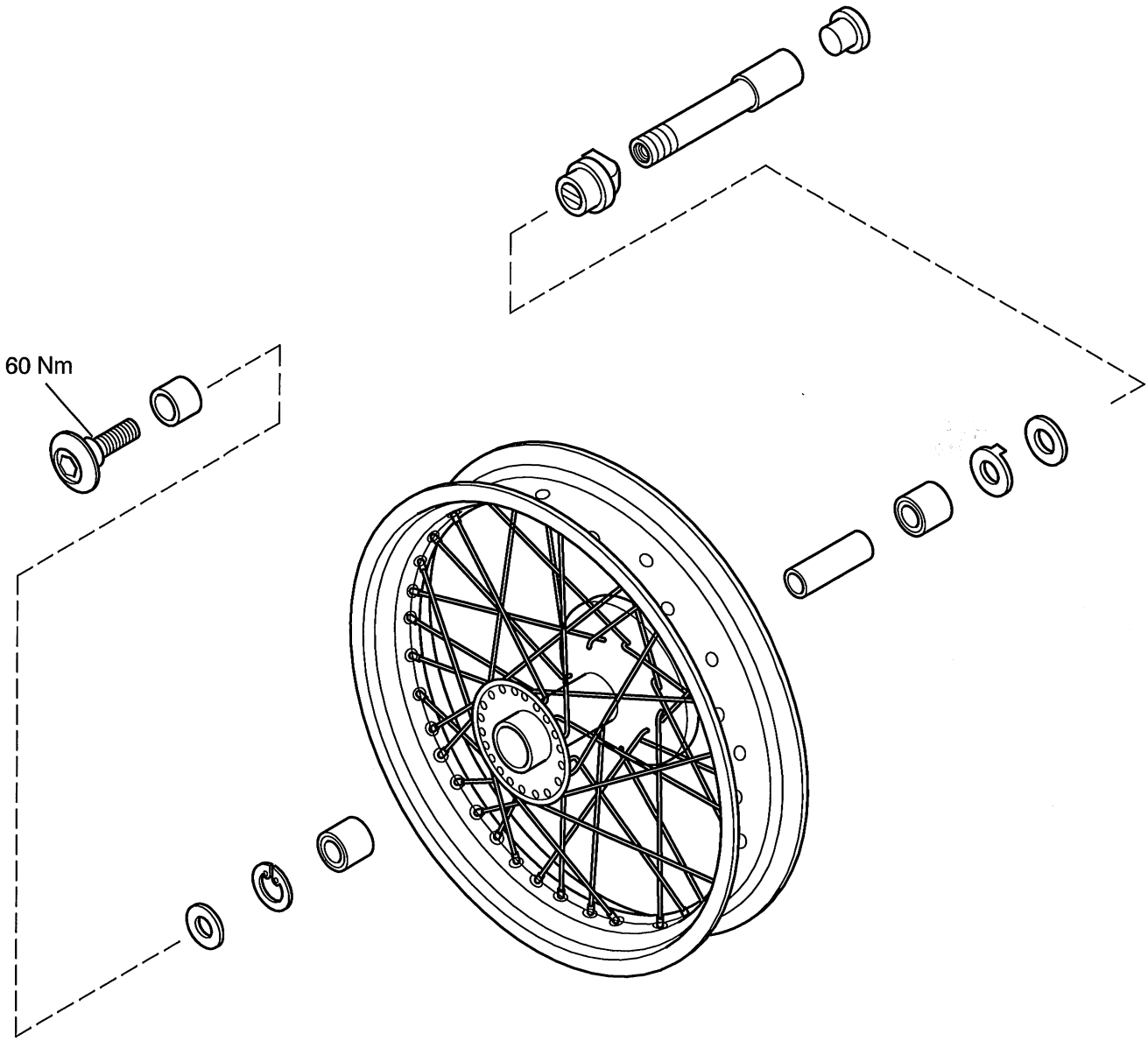
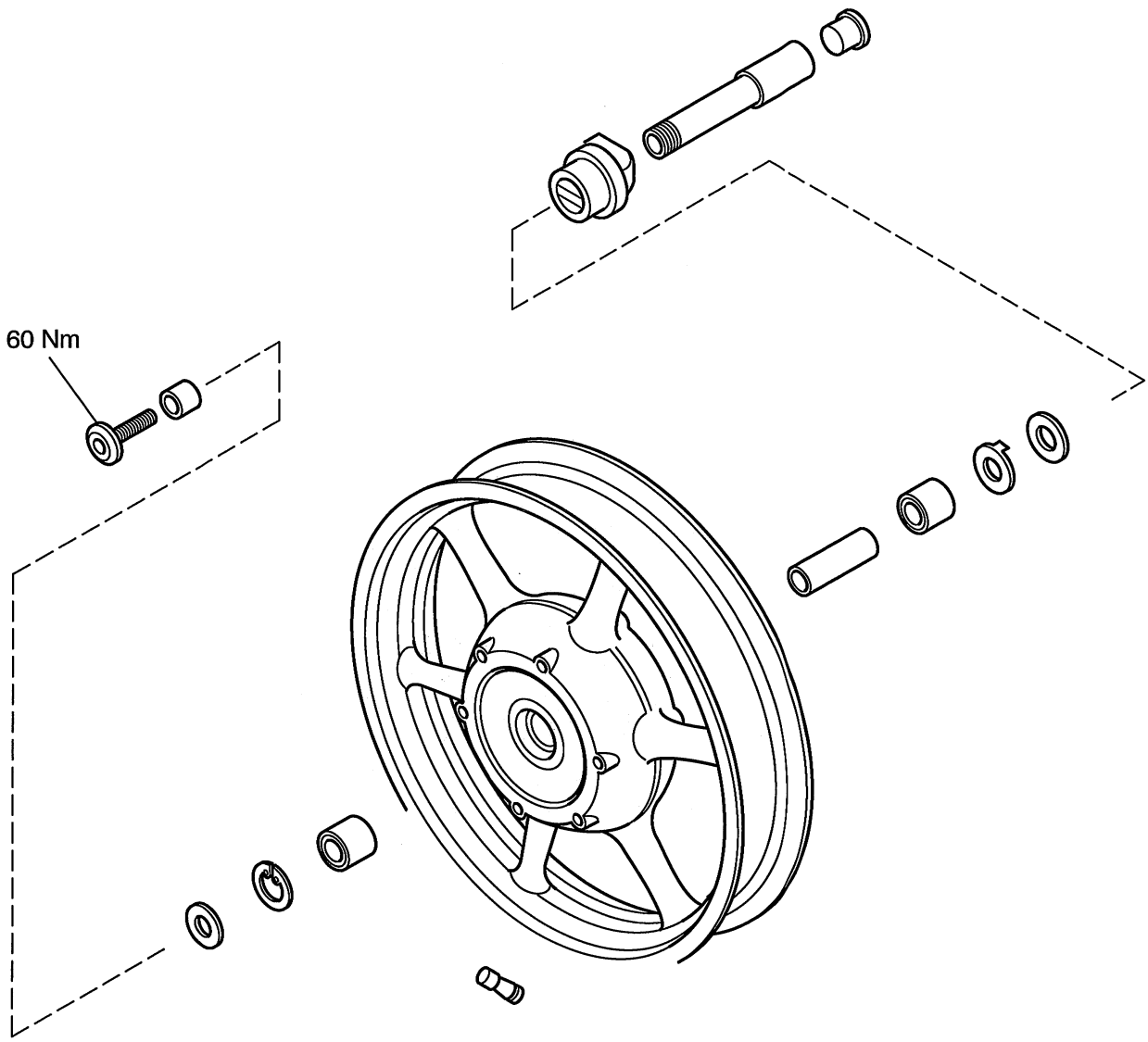
Exploded View
Front wheel assembly - Bonneville, Bonneville T100, Scrambler & Thruxton



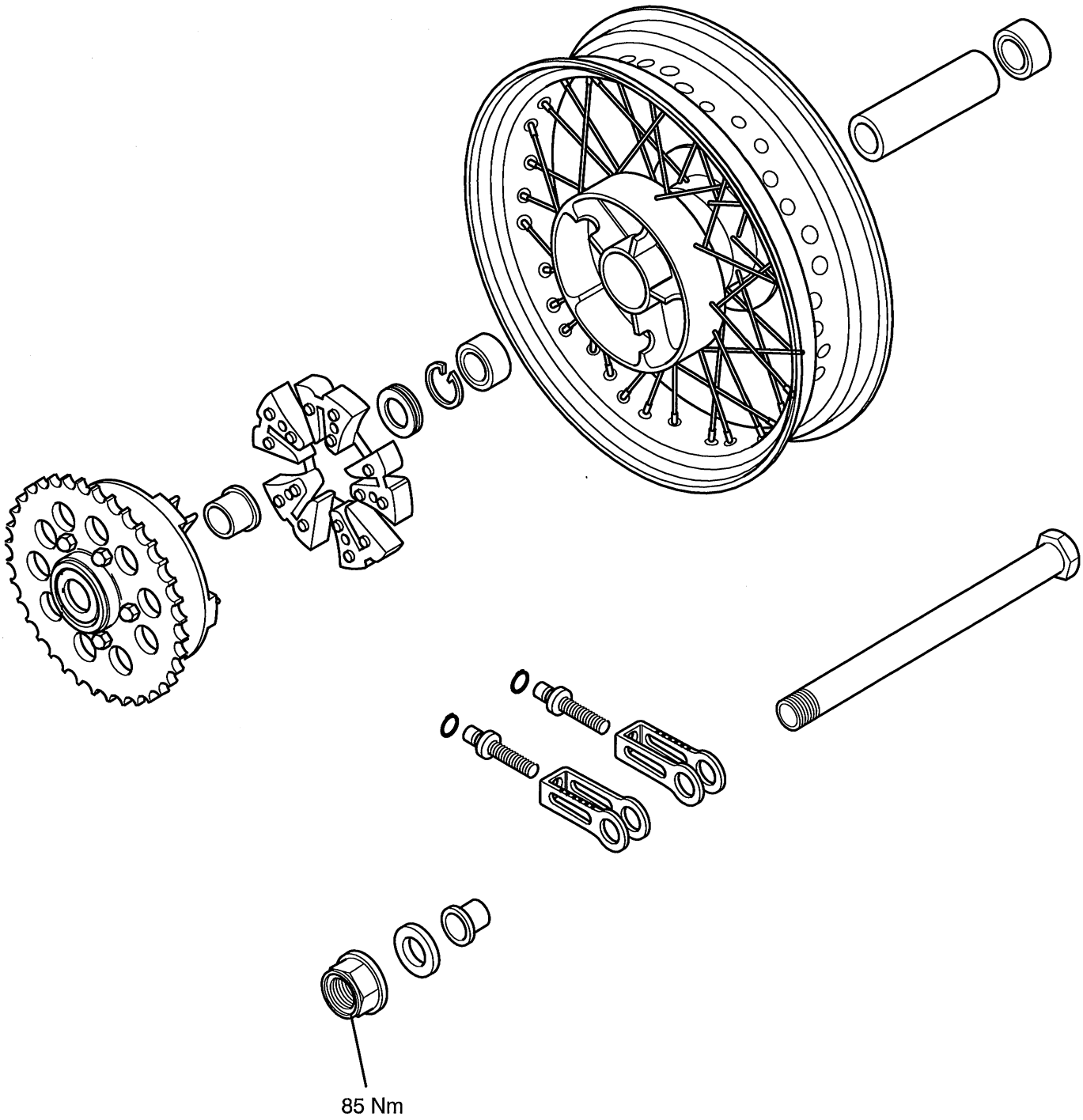
Exploded View
Front wheel assembly - America



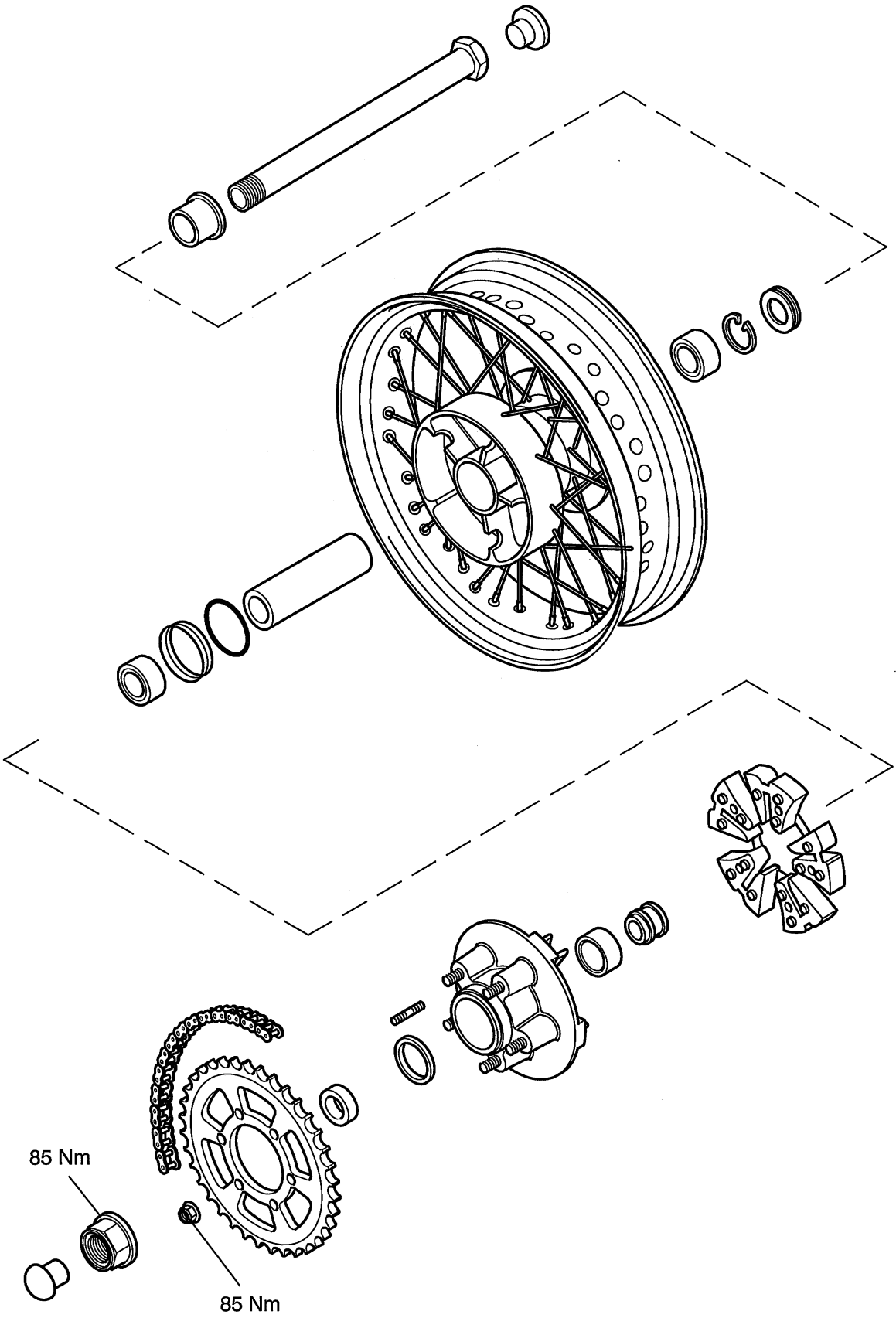
Exploded View
Front wheel assembly - Speedmaster



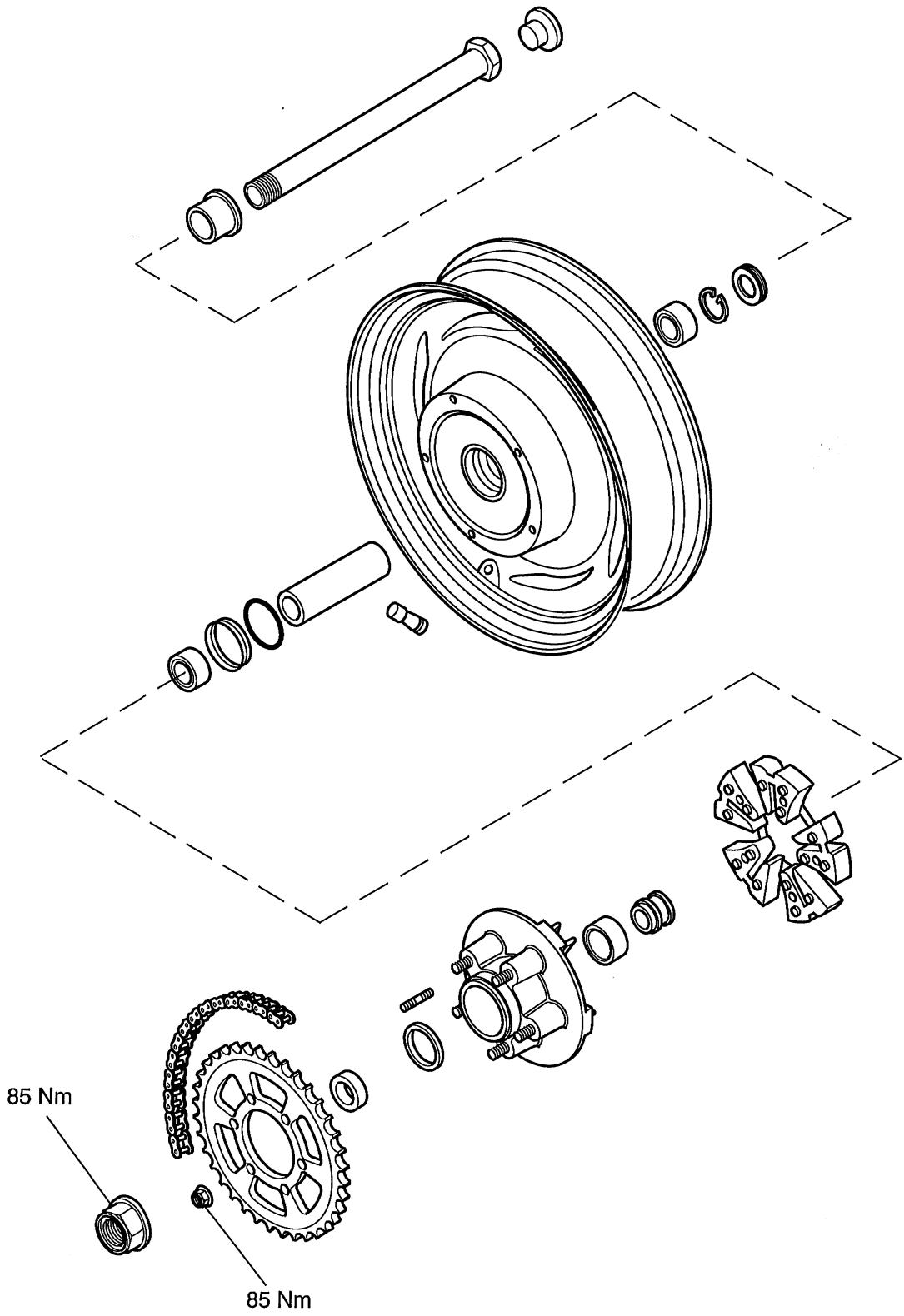
Exploded View
Rear wheel assembly - Bonneville, Bonneville T100, Scrambler & Thruxton



Exploded View
Rear wheel assembly - America



Exploded View
Rear wheel assembly - Speedmaster

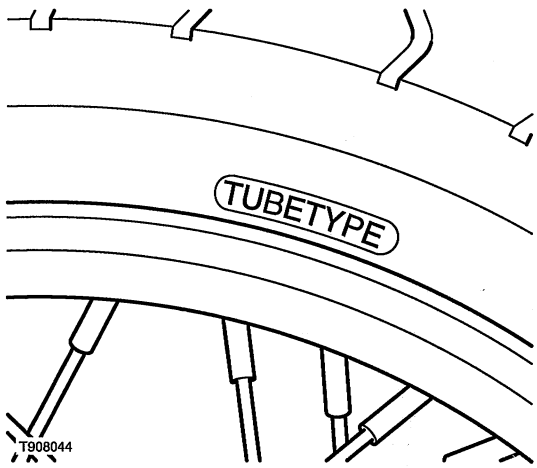


TYRE SAFETY PRECAUTIONS

Tyres

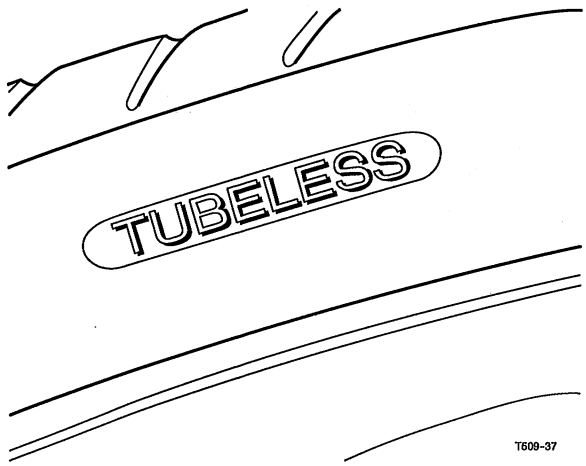
Bonneville, Bonneville T100, Thruxton, Scrambler and America models are equipped with spoked wheels which require a tyre suitable for use with an inner tube.

WARNING: Failure to use an inner tube in a spoked wheel will cause deflation of the tyre resulting in loss of control and an accident.

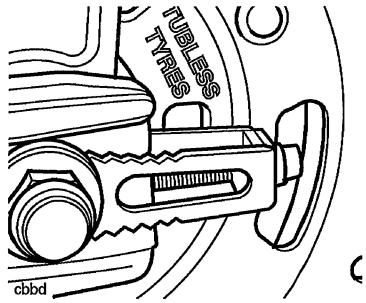


Typical Tyre Marking - Bonneville, Bonneville T100, Thruxton, Scrambler & America

Speedmaster models are equipped with tubeless tyres, valves and wheel rims. Use only tyres marked 'TUBELESS' and tubeless valves on rims marked 'SUITABLE FOR TUBELESS TYRES'.



Typical Tyre Marking - Speedmaster



Wheel Marking - Speedmaster

Tyre Pressures

Correct inflation pressure will provide maximum stability, rider comfort and tyre life. Tyre pressures should be checked frequently and adjusted as necessary. The tables below show the correct tyre pressures for each model.

	Bonneville, Bonneville T100 & Thruxton	
	Solo	Fully laden
Front	2.27 Bar (33 lb/in^2)	2.27 Bar (33 lb/in^2)
Rear	2.62 Bar (38 lb/in^2)	2.62 Bar (38 lb/in^2)

	America	
	Solo	Fully laden
Front	2.07 Bar (30 lb/in^2)	2.14 Bar (31 lb/in^2)
Rear	2.14 Bar (31 lb/in^2)	2.50 Bar (36 lb/in^2)

	Speedmaster	
	Solo	Fully laden
Front	2.50 Bar (31 lb/in^2)	2.50 Bar (31 lb/in^2)
Rear	2.50 Bar (31 lb/in^2)	2.50 Bar (36 lb/in^2)

	Scrambler	
	Solo	Fully laden
Front	2.07 Bar (30 lb/in^2)	2.07 Bar (30 lb/in^2)
Rear	2.34 Bar (34 lb/in^2)	2.34 Bar (34 lb/in^2)

WARNING: Incorrect tyre inflation will cause abnormal tread wear and instability problems which may lead to loss of control and an accident.

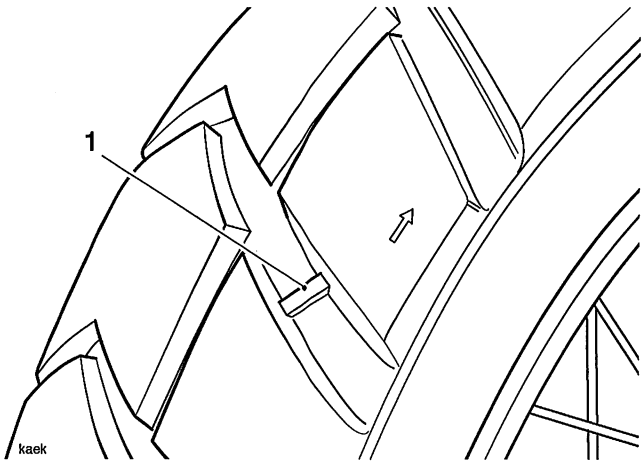
Under-inflation may result in the tyre slipping on, or coming off the rim. Over-inflation will cause instability and accelerated tread wear.

Both conditions are dangerous as they may cause loss of control leading to an accident.

Tyre Wear/Wheel Inspection

As the tyre tread wears down, the tyre becomes more susceptible to puncture and failure. It is estimated that 90% of all tyre failures occur during the last 10% of tread life (90% worn). It is false economy and unsafe to use tyres until they are worn to their minimum.

All tyres are fitted with tread wear indicators. When the tyre becomes worn down as far as the top of a tread wear indicator, the tyre is worn beyond its service life and must be replaced.



1. Tread Wear Indicator

In accordance with the scheduled maintenance chart, measure the depth of the tread with a depth gauge, and replace any tyre that has worn to, or beyond the minimum allowable tread depth. Inspect wheels for cracks, splits, kerb damage, dents and deformation. Check for loose or damaged spokes (on spoked wheels only). Always replace wheels that are suspected of being damaged.

WARNING: Operation with excessively worn tyres or damaged/defective wheels is hazardous and will adversely affect traction, stability and handling which may lead to loss of control or an accident.

Check the tyres for cuts, imbedded nails or other sharp objects. Replace any that are damaged or worn.

Check spokes (where fitted) for looseness and damage. Replace wheels where spoke damage/looseness is evident.

Check the wheel rims for cracks, splits, kerb damage, dents and deformation and replace any that shows signs of being defective.

Always consult your Triumph Dealer for tyre replacement, or for a safety inspection of the tyres.

Minimum Recommended Tread Depth

The following chart can be used as a guide to the minimum safe tread depth.

Under 130 km/h (80mph)	2 mm (0.08 in)
Over 130 km/h (80 mph)	Rear 3 mm (0.12 in) Front 2 mm (0.08 in)

WARNING: Triumph motorcycles must not be operated above the legal road speed limit except in authorised closed course conditions.

Operation at high speed in closed course conditions should only be undertaken by riders experienced in, and trained for such conditions.

WARNING: Tyres and inner tubes that have been used on a rolling road dynamometer may become damaged. In some cases, the damage may not be visible on the external surface of the tyre.

Tyres and inner tubes must be replaced after such use as continued use of a damaged tyre or inner tube may lead to instability, loss of motorcycle control and an accident.

IMPORTANT TYRE INFORMATION

WARNING: Inner tubes must only be used on motorcycles fitted with spoked wheels and with tyres marked 'TUBETYPE'.

Use of an inner tube with a tyre marked 'TUBELESS' and/or on an alloy wheel can lead to loss of motorcycle control and an accident.

All Triumph motorcycles are carefully and extensively tested in a range of riding conditions to ensure that the most effective tyre combinations are approved for use on each model. It is essential that approved tyre combinations are used when purchasing replacement tyres as the use of non approved tyres or approved tyres in non approved combinations may lead to motorcycle instability. Always refer to the owner's handbook data section for details of approved tyres and tyre combinations or ask your authorised Triumph dealer.

WARNING: If a tyre or inner tube sustains a puncture, the tyre and inner tube must be replaced together. Failure to replace a punctured tyre and inner tube together, or operation with a repaired tyre or inner tube can lead to instability, loss of control or an accident.

If tyre or inner tube damage is suspected, such as after striking the kerb, ask your authorised Triumph dealer to inspect the tyre both internally and externally and to also inspect the inner tube. Remember, tyre damage may not always be visible from the outside. Operation of the motorcycle with damaged tyres could lead to loss of control and an accident.

When replacing a tyre on a spoked wheel, always inspect the rim tape (rim protection band) to ensure that it is correctly protecting the tube from the spoke threads. A damaged rim tape may lead to rapid tyre deflation causing loss of control and an accident.

NOTE:

- Thruxton only, the rim band is glued in place around the wheel rim, if the rim band becomes detached from the wheel rim, re-secure with cyanoacrylate adhesive.

WARNING: Always check tyre pressures before riding when the tyres are cold. Operation with incorrectly inflated tyres may affect handling leading to loss of control and an accident.

WARNING: Operation with excessively worn or damaged tyres will impair stability and handling leading to loss of control or an accident.

WARNING: The use of tyres other than those listed in the specification section of the owner's handbook may adversely affect handling leading to loss of control or an accident.

Use the recommended tyre options only in the combinations given in the owner's handbook.

Do not mix tyres from different manufacturers or tyres from the same manufacturer but from another option.

For example, do not use option 1 front tyres with option 2 rear tyres.

WARNING: Accurate wheel balance is necessary for safe, stable handling of the motorcycle. Do not remove or change any wheel balance weights. Incorrect wheel balance may cause instability leading to loss of control and an accident.

When wheel balancing is required, such as after tyre replacement, see your authorised Triumph dealer. Only use self-adhesive weights. Clip on weights will damage the wheel and tyre resulting in tyre deflation, loss of control and an accident.

WARNING: When replacement tyres are required, consult your authorised Triumph dealer who will arrange for the tyres to be fitted according to the tyre manufacturers instructions.

When tyres are replaced, allow time for the tyre to seat itself to the rim (approximately 24 hours). During this seating period, ride cautiously as an incorrectly seated tyre could cause loss of control or an accident. Initially, the new tyre will not produce the same handling characteristics as the worn tyre and the rider must allow adequate riding distance (approximately 100 miles) to become accustomed to the new handling characteristics.

After both 24 hours and 100 miles, the tyre pressures should be checked and adjusted and the tyre examined for correct seating and rectified as necessary.

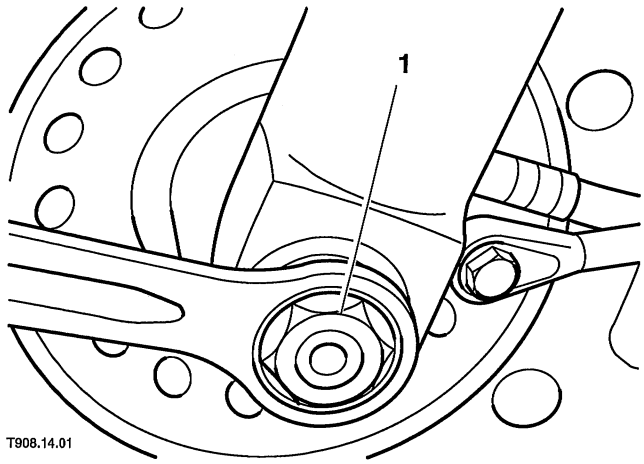
Use of a motorcycle when not accustomed to its handling characteristics may lead to loss of control and an accident.

FRONT WHEEL

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

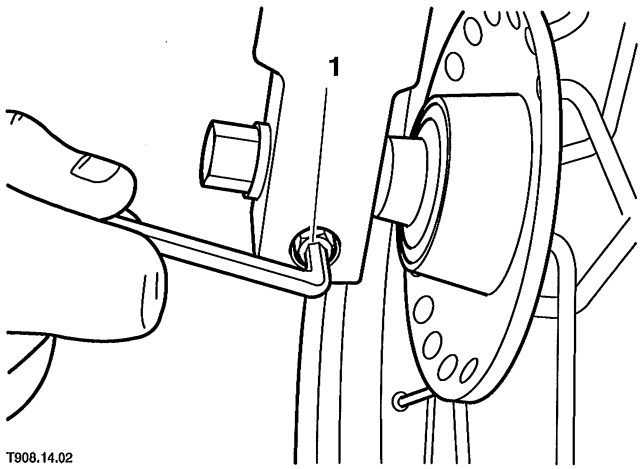
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Slacken the front wheel spindle nut.



1. Front wheel spindle nut (Bonneville shown)

2. Slacken the spindle clamp bolt fitted to the right-hand fork.

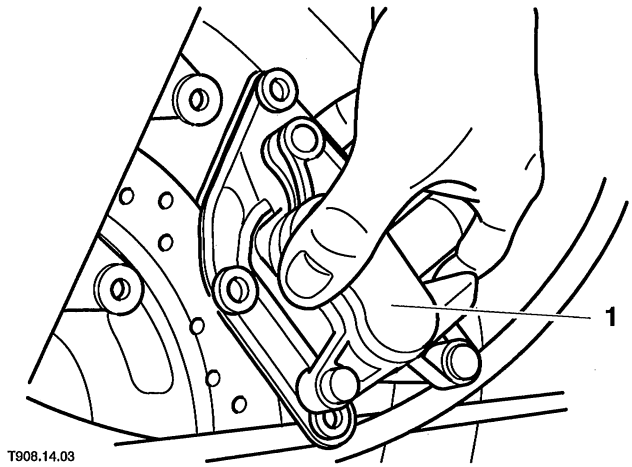


1. Spindle clamp bolt

3. Unscrew the front brake caliper mounting bolts and slide the caliper assembly off the disc.

NOTE:

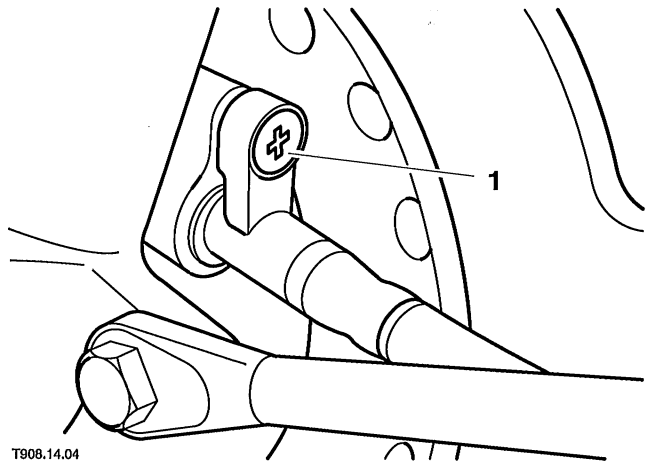
- **Support the caliper to avoid placing any strain on the hydraulic hose.**



1. Front brake caliper

4. Support the motorcycle so the front wheel is raised clear of the ground.

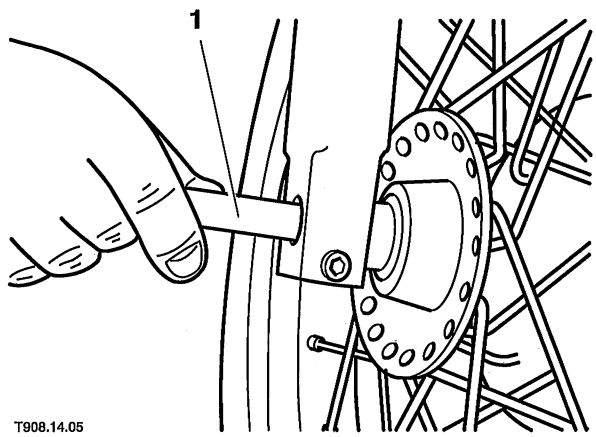
5. Undo the screw and detach the speedometer cable from its drive.



1. Speedometer cable screw (Bonneville shown)

6. Remove the nut and washer from the front wheel spindle.

7. Support the wheel and withdraw the spindle.



1. Spindle

8. Manoeuvre the wheel out from the forks and recover the spacer from the right side of the hub and the speedometer drive assembly from the left side of the hub.

CAUTION: Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.

Inspection - Bonneville, Bonneville T100, Scrambler & Thruxton

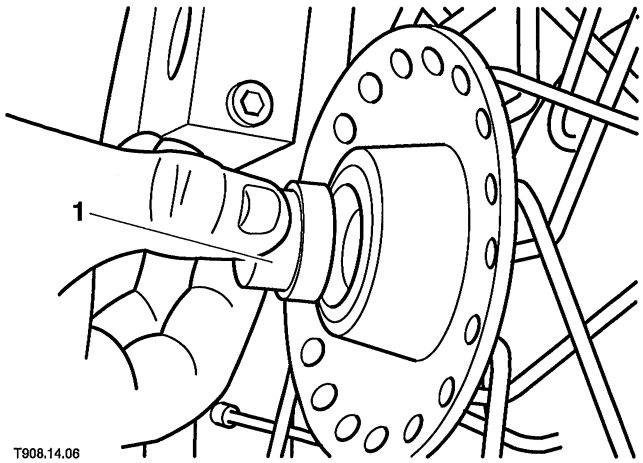
1. Check closely for signs of loose or broken spokes. Renew/tighten spokes as necessary.

2. Check the wheel bearings spin smoothly with no signs of play. If not, renew both bearings.

3. Inspect the speedometer drive and its driveplate for signs of wear or damage. Renew as necessary.

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

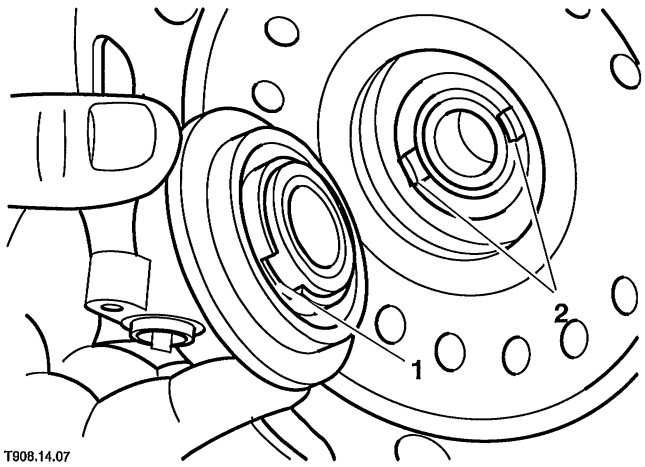
1. Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.
2. Thoroughly clean both sides of the brake disc.
3. Fit the spacer to the right side of the wheel.



T908.14.06

1. Spacer

4. Align the drive gear cut-outs with the driveplate tabs and fit the speedometer drive to the left side of the wheel.



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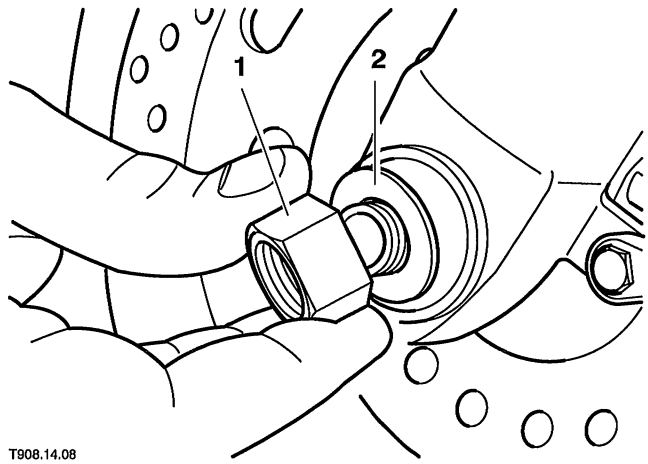
1. Drive gear cut-out

2. Driveplate tabs

5. Position the wheel in between the forks and insert the spindle from the right-hand side.
6. Fit the washer and nut to the spindle and hand-tighten.



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1. Nut

2. Washer

7. Slide the caliper into position, ensuring the pads pass either side of the disc, and tighten its mounting bolts to **28 Nm**. Operate the brake lever a few times to ensure the pads are in firm contact with the disc.
8. Lower the motorcycle to the ground and park on the side stand.
9. Ensure the speedometer drive tab is tight against the rear of the lug on the left fork then tighten the spindle nut to **60 Nm**.
10. Reconnect the cable to the speedometer drive and securely tighten its retaining screw.
11. Pump the front forks a few times to settle them in position then tighten the spindle clamp bolt to **27 Nm**.

FRONT WHEEL

Removal - America

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

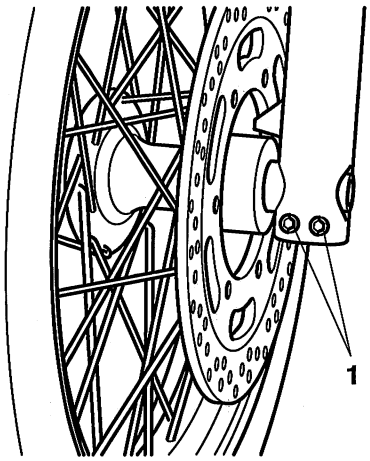
1. Support the motorcycle so that the front wheel is clear of the ground.

NOTE:

- **Provided that the front of the motorcycle is raised sufficiently, it is not necessary to remove the front brake caliper to remove the wheel.**

2. Remove the front wheel spindle bolt.

3. Slacken the wheel spindle clamp bolts on both forks.



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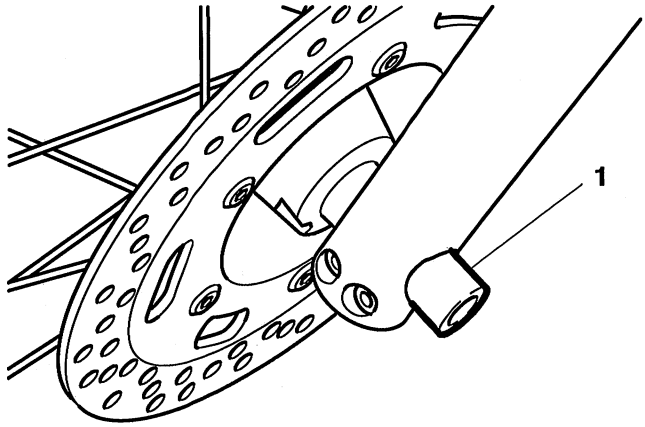
1. Spindle clamp bolts

4. Support the wheel and withdraw the spindle.



T908.PIC02A

1. Wheel Spindle

5. Manoeuvre the wheel out from the forks collecting the speedometer drive as you do so.

CAUTION: With the wheel removed, always support the speedometer cable and drive and do not allow either component to become twisted or to fall onto dirty surfaces.

Twisting or falling onto dirty surfaces could lead to premature wear and/or erratic speedometer operation.

6. Recover the spacer from the right side of the hub

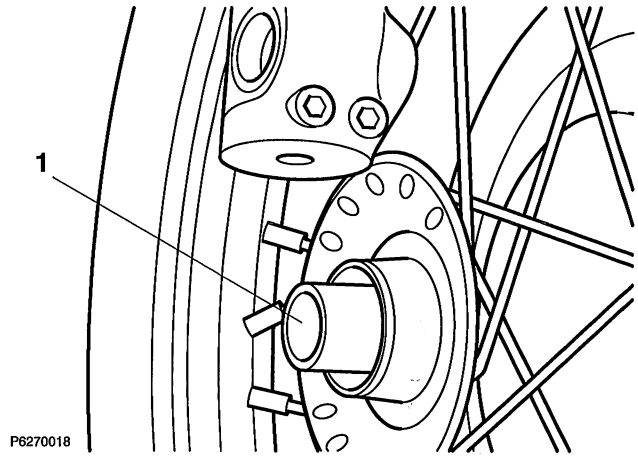
CAUTION: Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.

Inspection - America

1. Check closely for signs of loose or broken spokes. Renew/tighten spokes as necessary.
2. Check the wheel bearings spin smoothly with no signs of play. If not, renew both bearings.
3. Inspect the speedometer drive and its driveplate for signs of wear or damage. Renew as necessary.

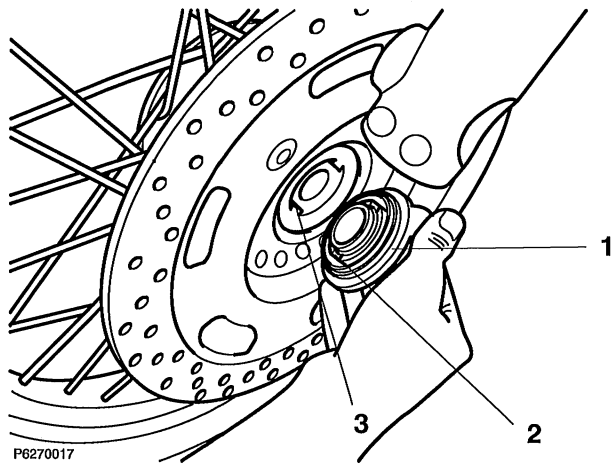
Installation - America

1. Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.
2. Thoroughly clean both sides of the brake disc.
3. Position the wheel between the forks and fit the spacer to the right side of the wheel.



1. Spacer

4. Align the speedometer drive gear cut-outs with the driveplate tabs and fit the drive to the left side of the wheel.



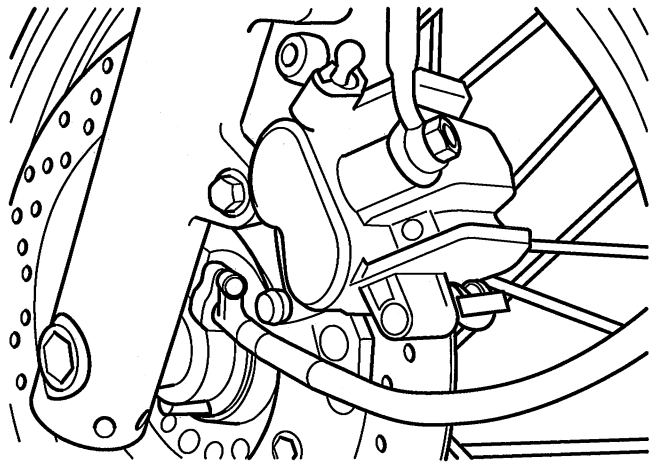
1. Speedometer drive
2. Drive cut-outs
3. Driveplate tabs

5. Align the wheel to the fitted position and insert the spindle from the left-hand side.

6. On the right-hand side, fit the bolt to the spindle and tighten to **60 Nm.**

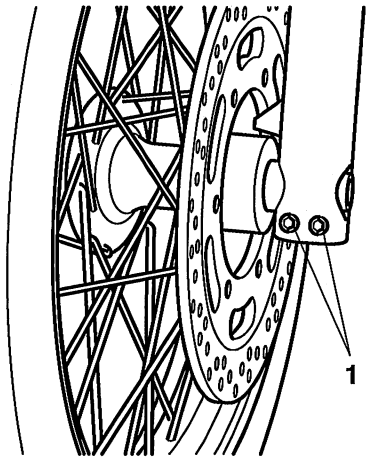
7. Lower the motorcycle to the ground and park on the side stand.

8. Ensure the speedometer drive is positioned as shown below.



Speedometer drive position

9. Pump the front forks a few times then tighten the spindle clamp bolt to **20 Nm.**



P6270020

1. Spindle clamp bolts

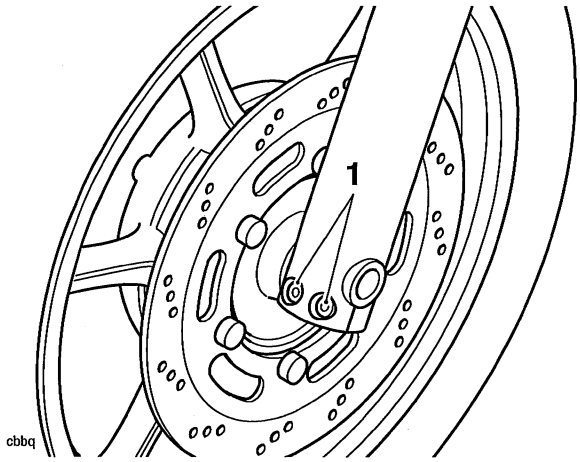
10. Park the motorcycle on the side stand.

FRONT WHEEL

Removal - Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle so that the front wheel is clear of the ground.
2. Remove the front wheel spindle bolt.
3. Slacken the wheel spindle clamp bolts on both forks.



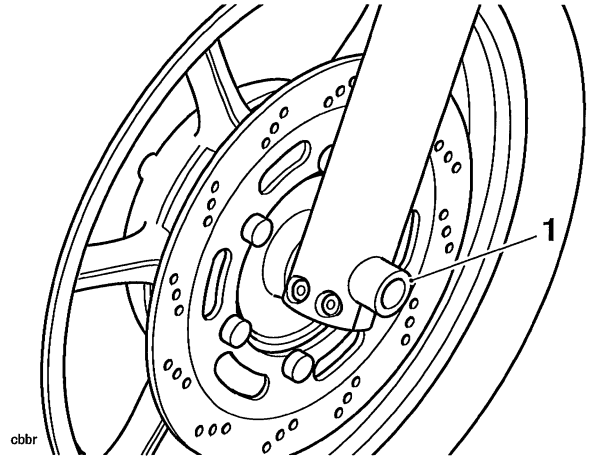
1. Spindle clamp bolts

4. Detach one of the front brake calipers from one of the front forks.

CAUTION: Do not allow the caliper to hang on its brake hose while detached from the fork as this could damage the brake hose.

To prevent brake hose damage, always support the caliper while it is detached from the fork.

5. Support the wheel and withdraw the spindle.



1. Wheel Spindle

6. Manoeuvre the wheel out from the forks collecting the speedometer drive as you do so.

CAUTION: With the wheel removed, always support the speedometer cable and drive and do not allow either component to become twisted or to fall onto dirty surfaces.

Twisting or falling onto dirty surfaces could lead to premature wear and/or erratic speedometer operation.

7. Recover the spacer from the right side of the hub

CAUTION: Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.

Inspection - Speedmaster

1. Check the wheel bearings spin smoothly with no signs of play. If not, renew both bearings.

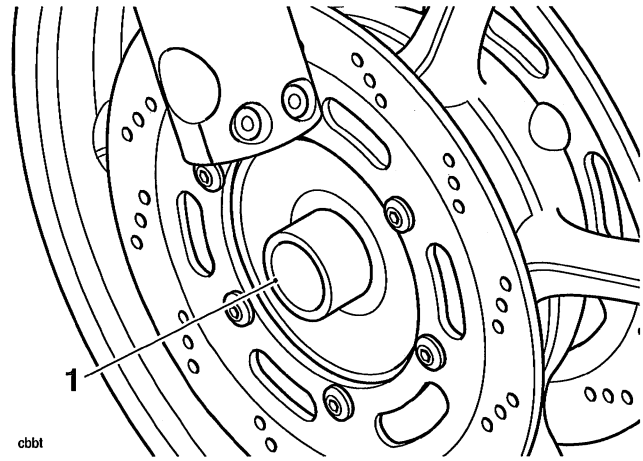
2. Inspect the speedometer drive and its driveplate for signs of wear or damage. Renew as necessary.

Installation - Speedmaster

1. Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.

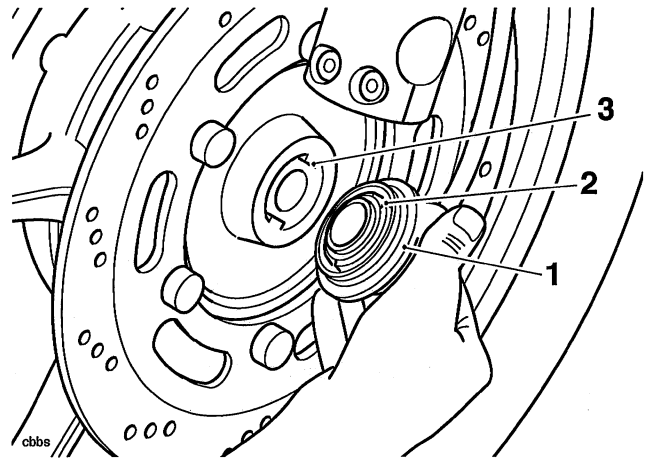
2. Thoroughly clean both sides of both the brake discs.

3. Position the wheel between the forks and fit the spacer to the right side of the wheel.



1. Spacer

4. Align the speedometer drive gear cut-outs with the driveplate tabs and fit the drive to the left side of the wheel.



1. Speedometer drive

2. Drive cut-outs

3. Driveplate tabs

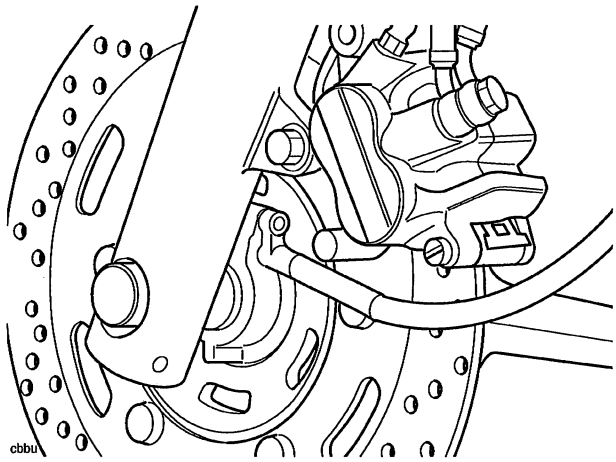
5. Align the wheel to the fitted position and insert the spindle from the left-hand side.

6. On the right-hand side, fit the bolt to the spindle and tighten to **60 Nm.**

7. Slide the displaced caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **28 Nm.**

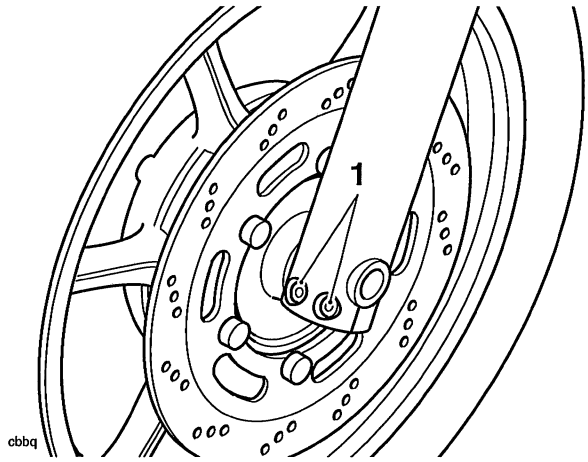
8. Lower the motorcycle to the ground and park on the side stand.

9. Ensure the speedometer drive is positioned as shown below.



Speedometer drive position

10. Pump the front forks a few times then tighten the spindle clamp bolt to **20 Nm.**



1. Spindle clamp bolts

11. Park the motorcycle on the side stand.

12. Operate the front brake several times to realign the brake pads.

REAR WHEEL

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

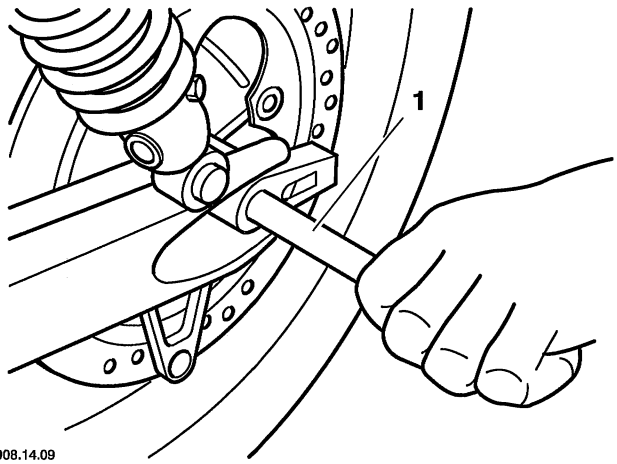
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle so the rear wheel is raised clear of the ground.
2. Remove both silencers (except Scrambler)see fuel system/exhaust section.
3. Slacken the rear wheel spindle nut.
4. Unscrew the rear brake caliper mounting bolts and slide the caliper assembly off the disc.

NOTE:

- **Support the caliper to avoid placing any strain on the hydraulic hose.**

5. Remove the spindle nut and washer then support the wheel and withdraw the spindle.

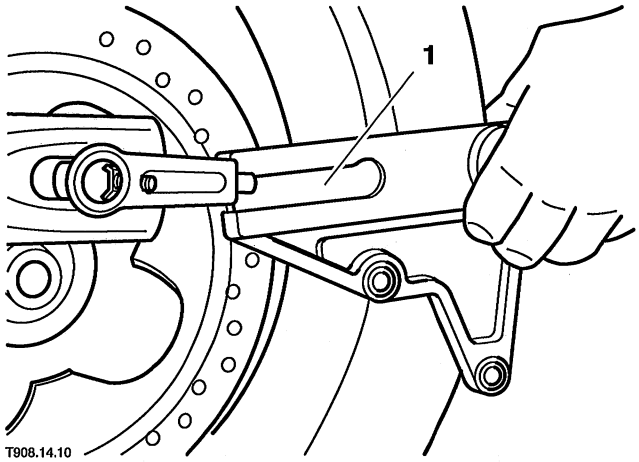


T908.14.09

1. Spindle

CAUTION: Do not fully release the chain adjusters before removing the wheel spindle. A fully released adjuster bolt can drag on the wheel spindle during removal resulting in a scored and damaged spindle.

6. Lower the wheel to the ground and collect the brake caliper mounting plate.

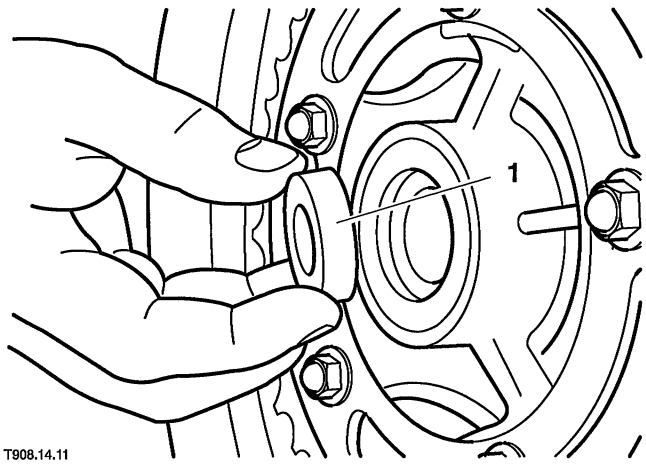


T908.14.10

1. Brake caliper mounting plate

7. Disengage the chain from the rear sprocket and hang it on the swinging arm.
8. Manoeuvre the wheel out of position and recover the spacers from the left side of the hub and sprocket coupling.

CAUTION: Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.



T908.14.11

1. Spacer

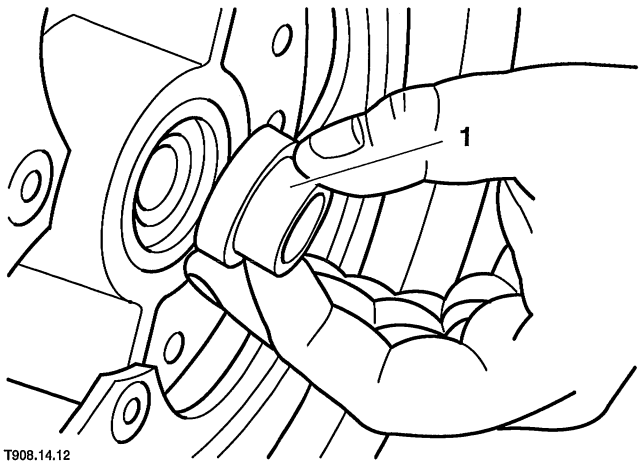
Inspection - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Check closely for signs of loose or broken spokes. Renew/tighten spokes as necessary.
2. Check the wheel bearings spin smoothly with no signs of play. If not, renew the bearings.

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.

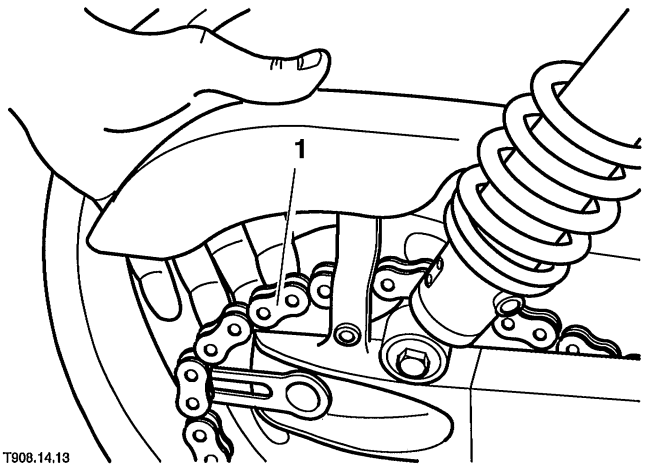
2. Fit the spacers to the left side of the wheel and the sprocket coupling.



T908.14.12

1. Spacer

3. Position the wheel in between the swinging arm and engage the chain with the sprocket.



T908.14.13

1. Chain

4. Fit the brake caliper mounting plate locating its slot on the swinging arm lug.

5. Lift the wheel into position, ensuring the spacers and caliper mounting plate remain correctly positioned, and insert the spindle.

6. Fit the washer and nut to the spindle and hand-tighten.

7. Slide the caliper into position, ensuring the pads pass either side of the disc, and tighten its mounting bolts to **40 Nm**. Operate the brake pedal a few times to ensure the pads are in firm contact with the disc.

8. Lower the motorcycle to the ground and adjust the drive chain freeplay (see final drive section), tightening the spindle nut to **85 Nm**.

9. If removed, install the silencers.

REAR WHEEL

Removal - America & Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle so the rear wheel is raised clear of the ground.
2. Slacken the rear wheel spindle nut.
3. Unscrew the rear brake caliper mounting bolts and slide the caliper assembly off the disc.

NOTE:

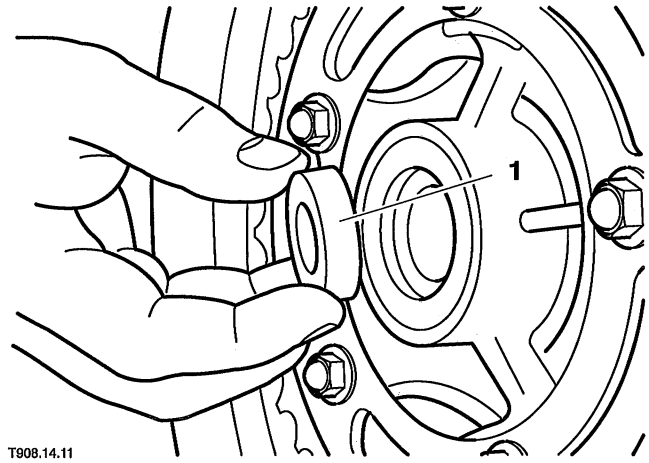
- **Support the caliper to avoid placing any strain on the brake hose.**

4. Remove the spindle nut and washer then support the wheel and withdraw the spindle.

CAUTION: Do not fully release the chain adjusters before removing the wheel spindle. A fully released adjuster bolt can drag on the wheel spindle during removal resulting in a scored and damaged spindle.

5. Lower the wheel to the ground and collect the brake caliper mounting plate.
6. Disengage the chain from the rear sprocket and hang it on the swinging arm.
7. Manoeuvre the wheel out of position and recover the spacers from the left side of the hub and sprocket coupling.

CAUTION: Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.



T908.14.11

1. Spacer

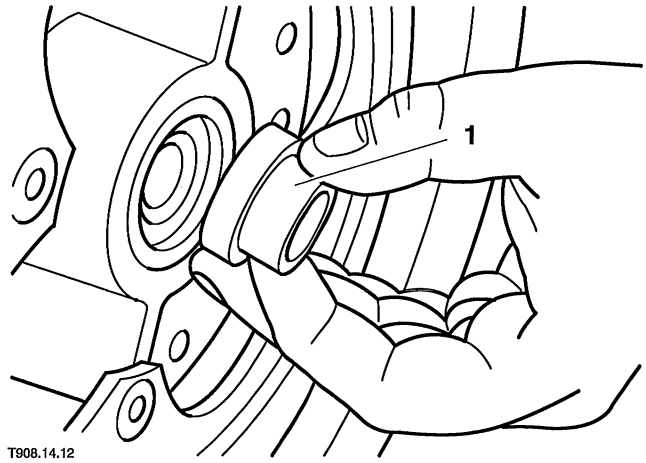
Inspection

1. America only: Check closely for signs of loose or broken spokes. Renew/tighten spokes as necessary.
2. Check the wheel bearings spin smoothly with no signs of play. If not, renew the bearings.

Installation - America & Speedmaster

1. Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.

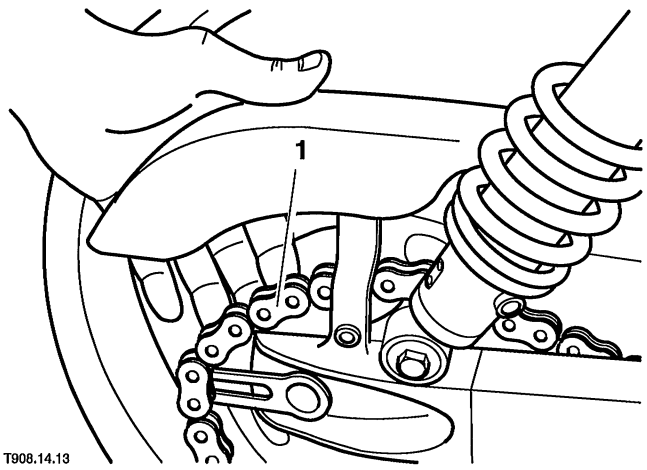
2. Fit the spacers to the left side of the wheel and the sprocket coupling.



T908.14.12

1. Spacer

3. Position the wheel in between the swinging arm and engage the chain with the sprocket.



T908.14.13

1. Chain

4. Fit the brake caliper mounting plate locating its slot on the swinging arm lug.

5. Lift the wheel into position, ensuring the spacers and caliper mounting plate remain correctly positioned, and insert the spindle.

6. Fit the washer and nut to the spindle and hand-tighten.

7. Slide the caliper into position, ensuring the pads pass either side of the disc, and tighten its mounting bolts to **40 Nm**. Operate the brake pedal a few times to ensure the pads are in firm contact with the disc.

8. Lower the motorcycle to the ground and park it on the sidestand.

9. Adjust the drive chain freeplay (see final drive section).

10. Tighten the spindle nut to **85 Nm**.

FRAME & BODYWORK

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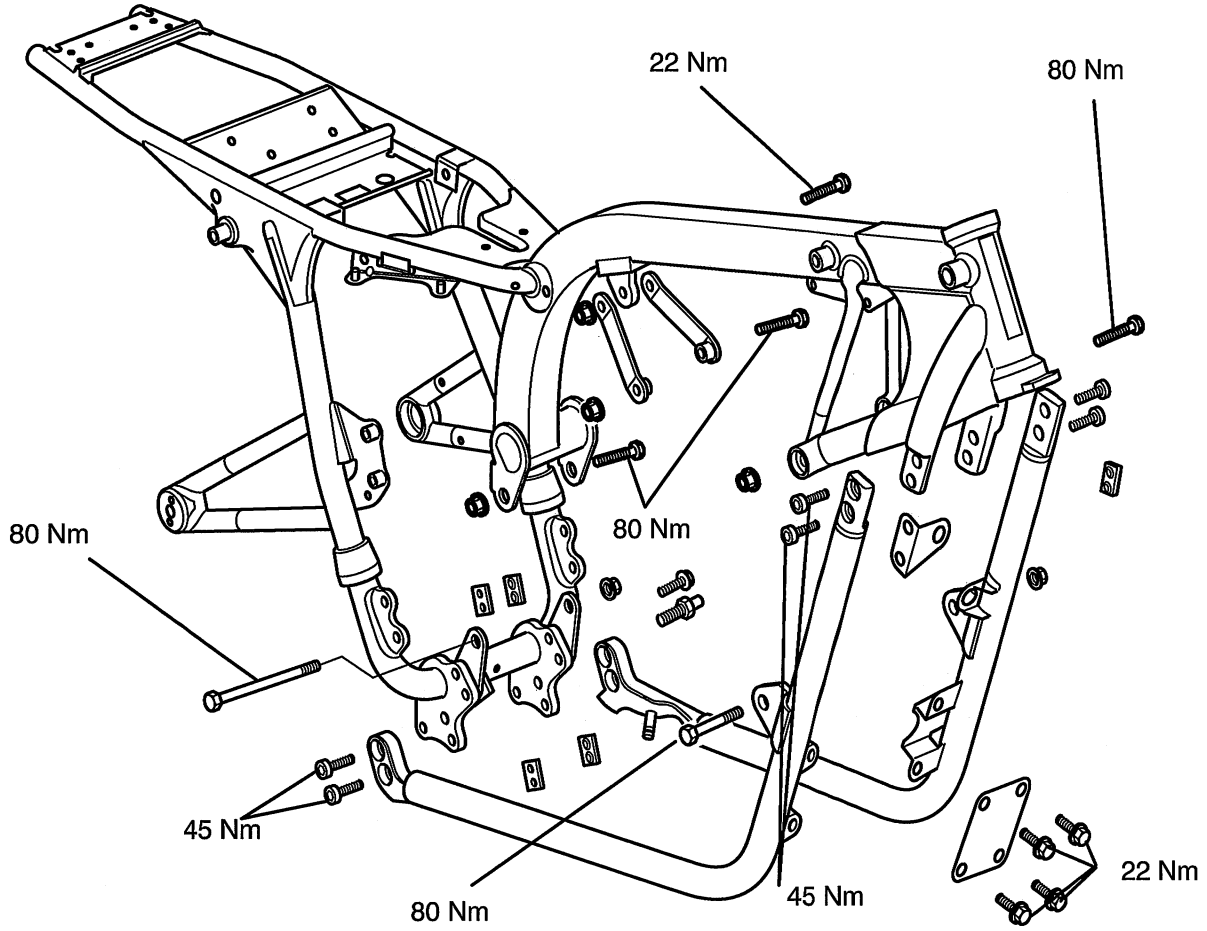
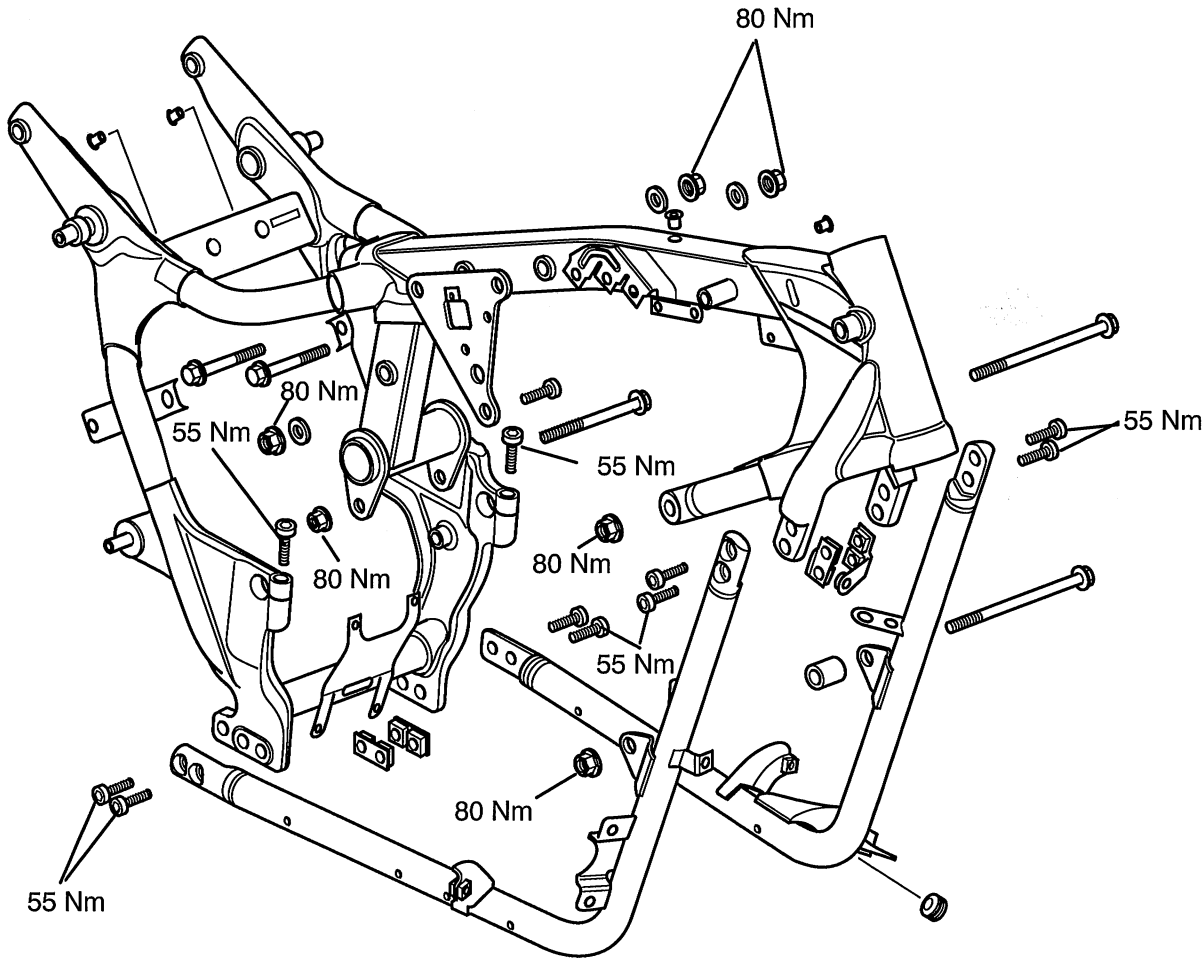
Exploded View

Frame and Fixings - Bonneville, Bonneville T100, Scrambler & Thruxton



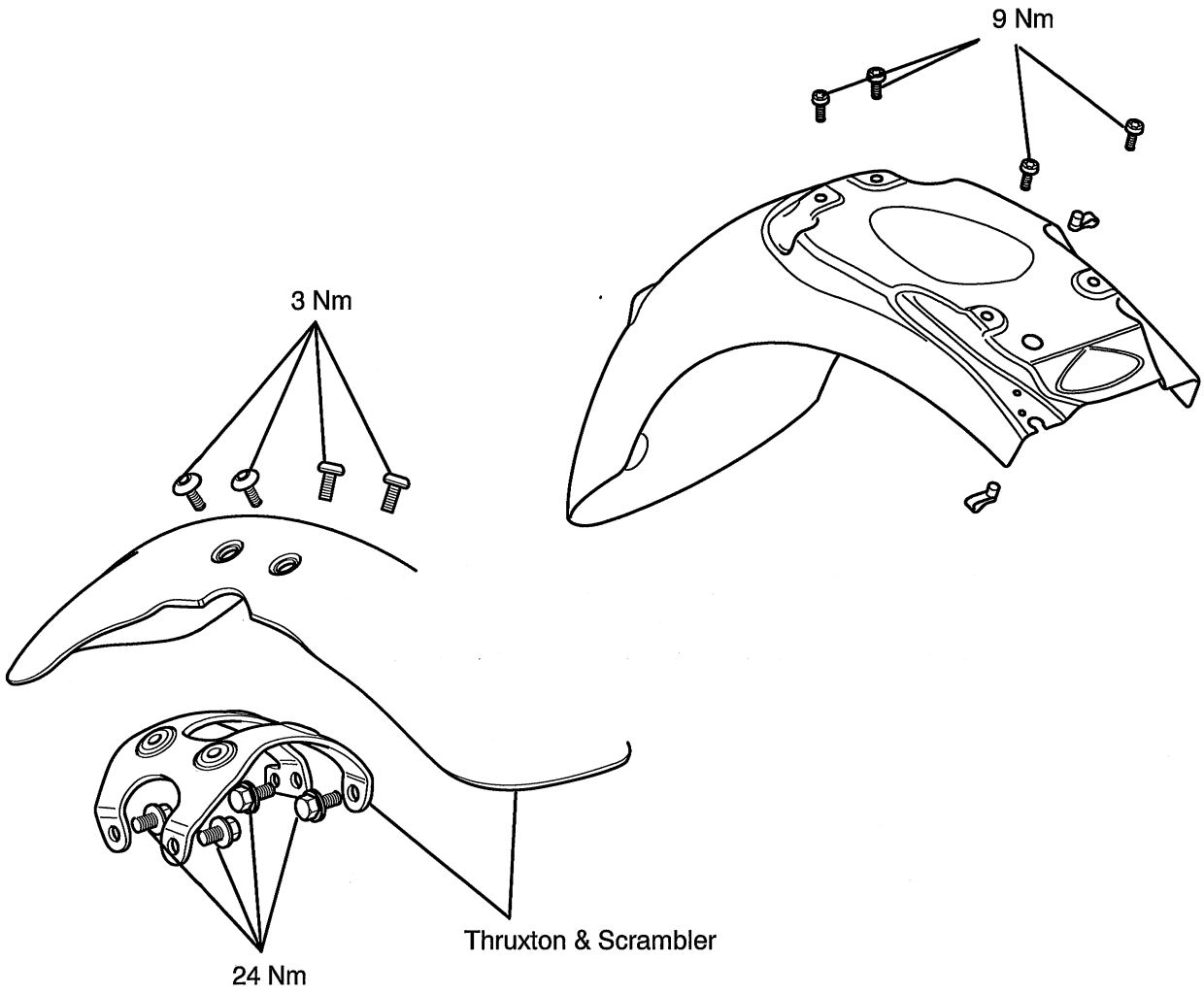
Exploded View

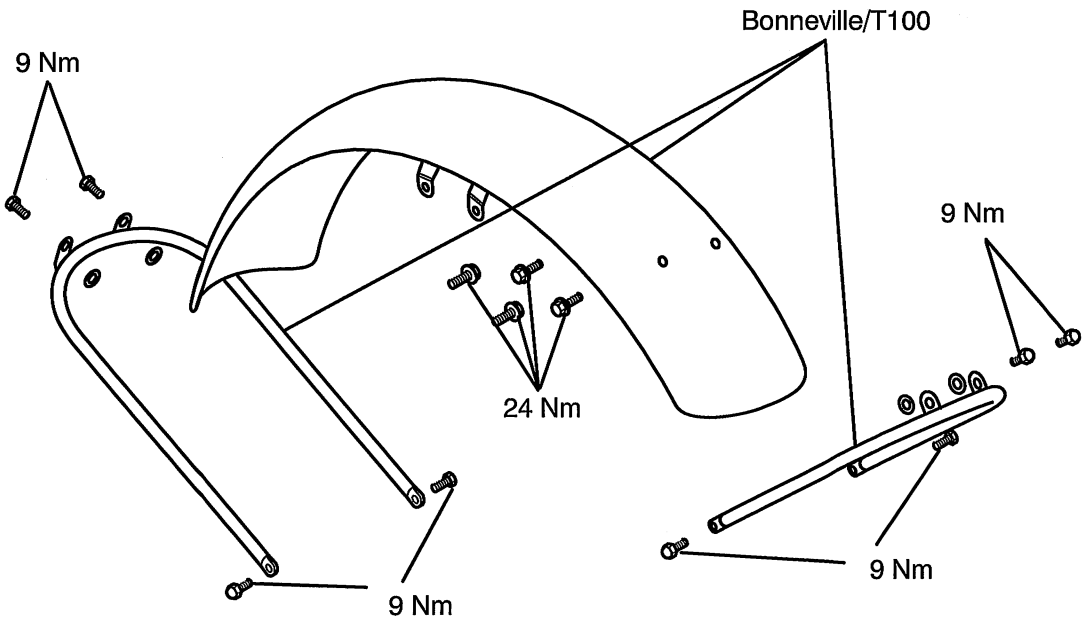
Frame and Fixings - America & Speedmaster



Exploded View

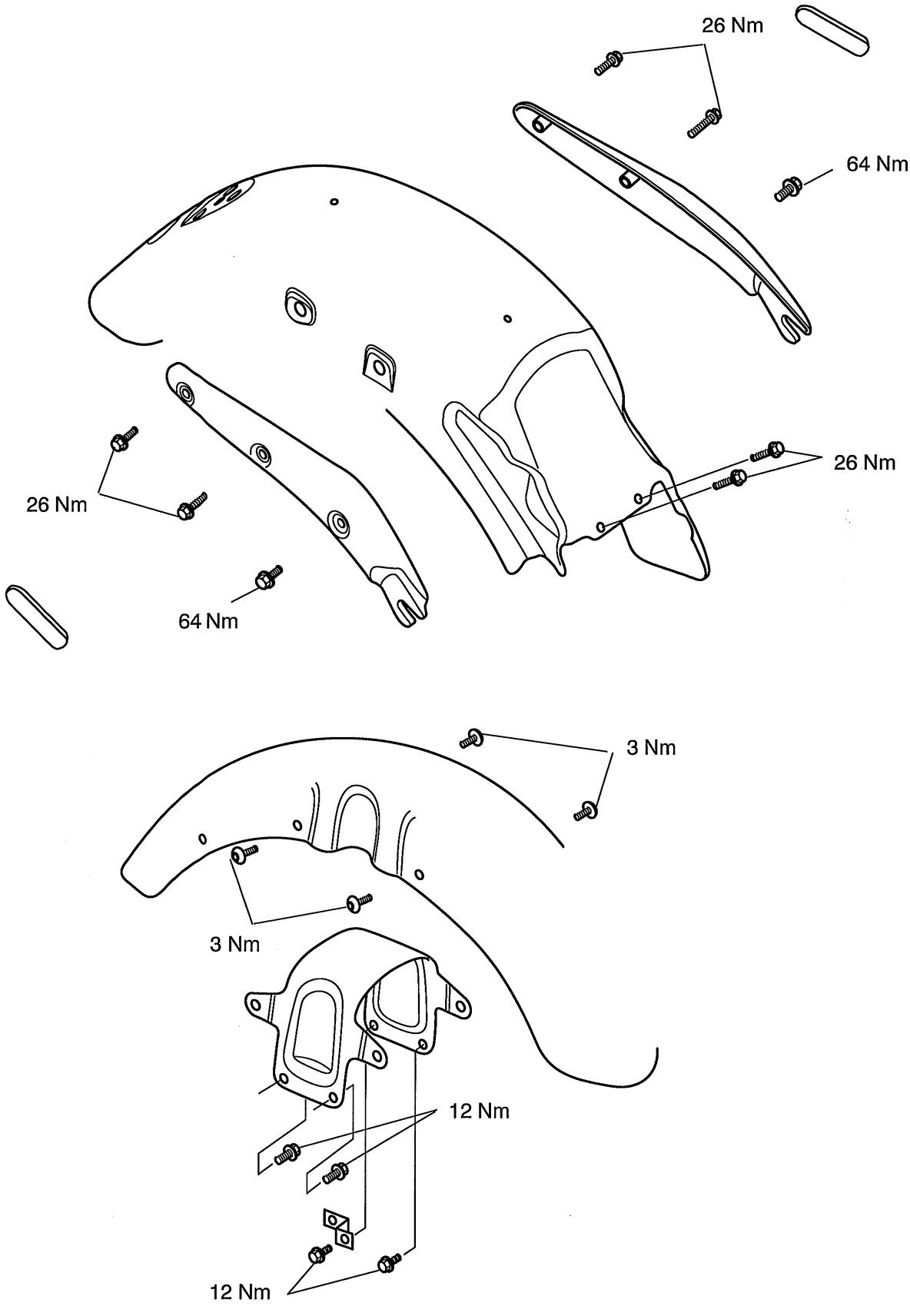
Front and Rear Mudguards - Bonneville, Bonneville T100, Scrambler & Thruxton





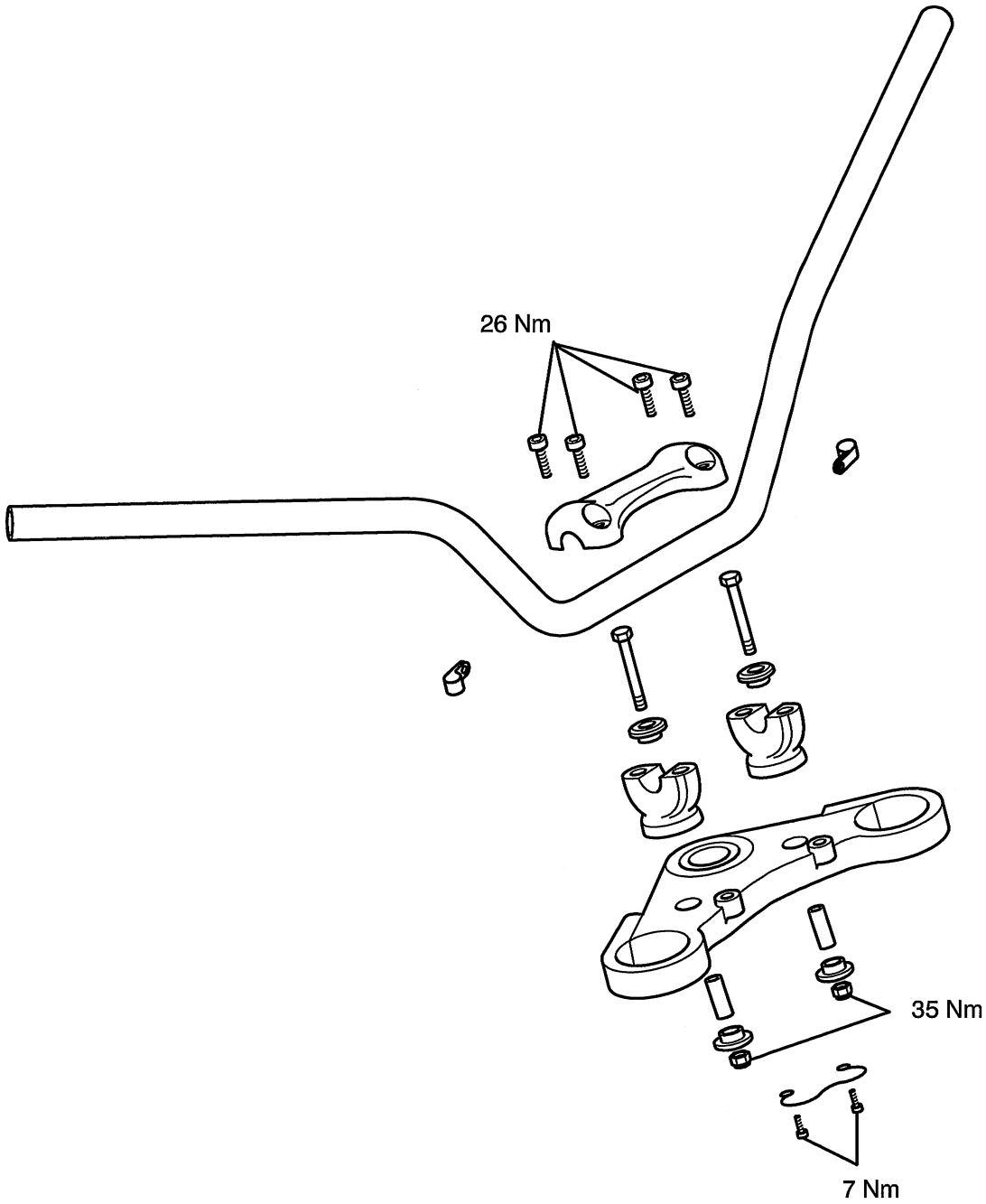
Exploded View

Front and Rear Mudguards - America & Speedmaster



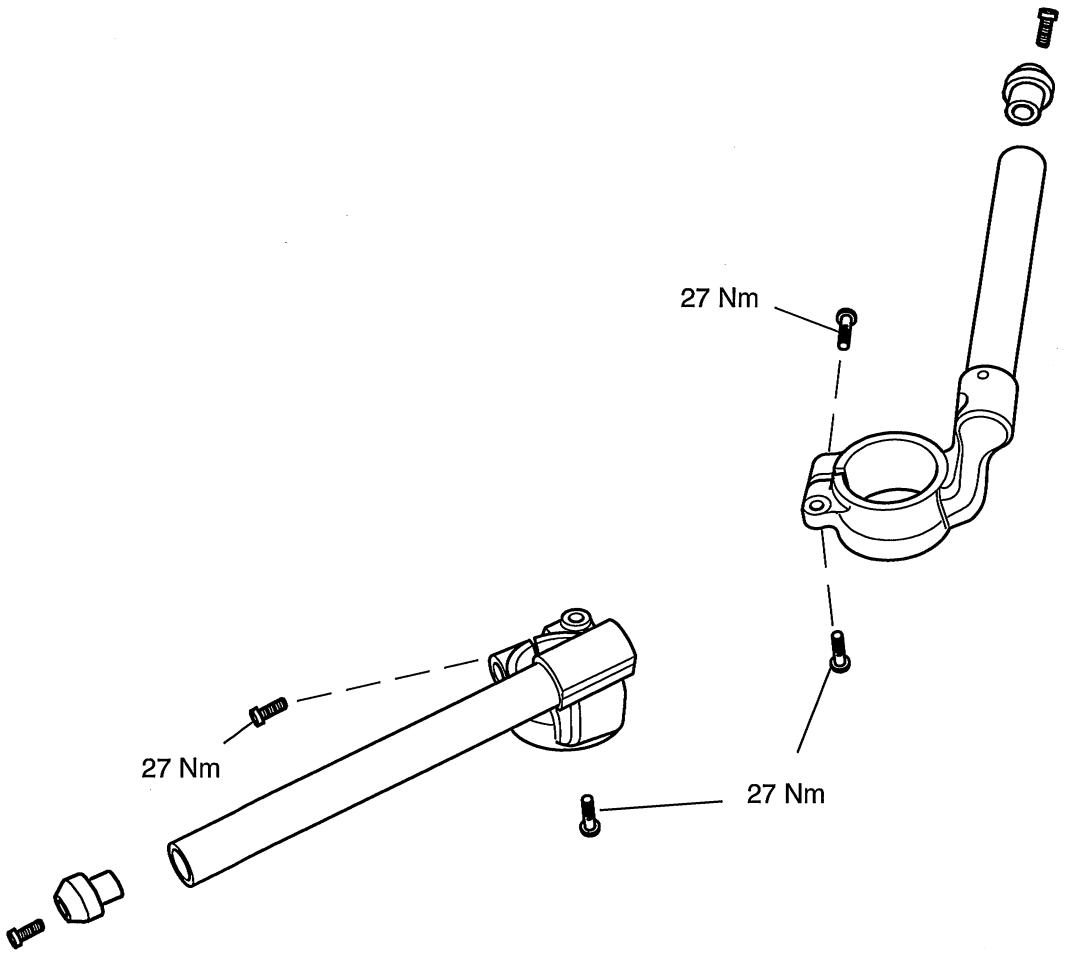
Exploded View

Handlebars - Bonneville, Scrambler & Bonneville T100



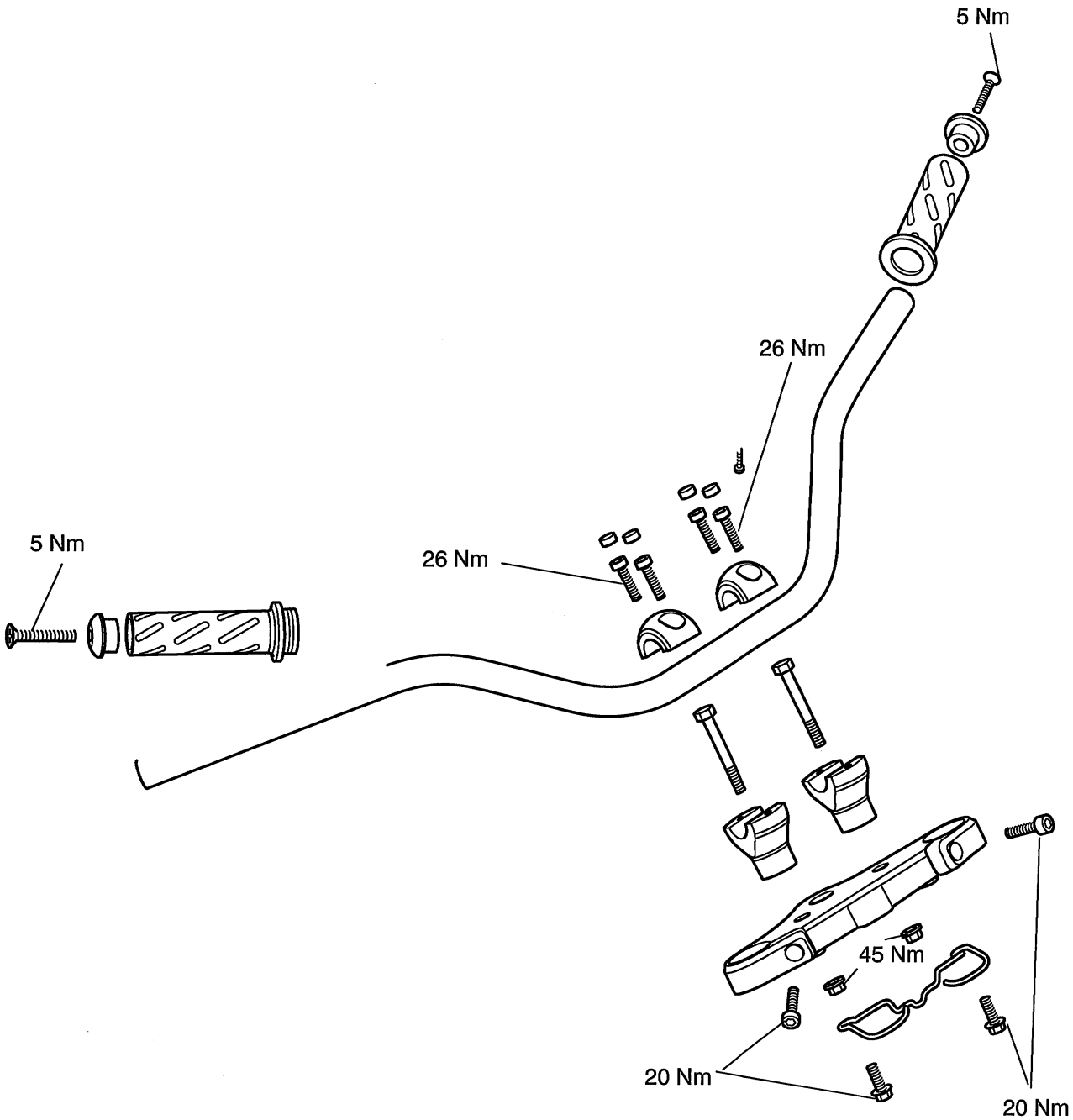
Exploded View

Handlebars - Thruxton



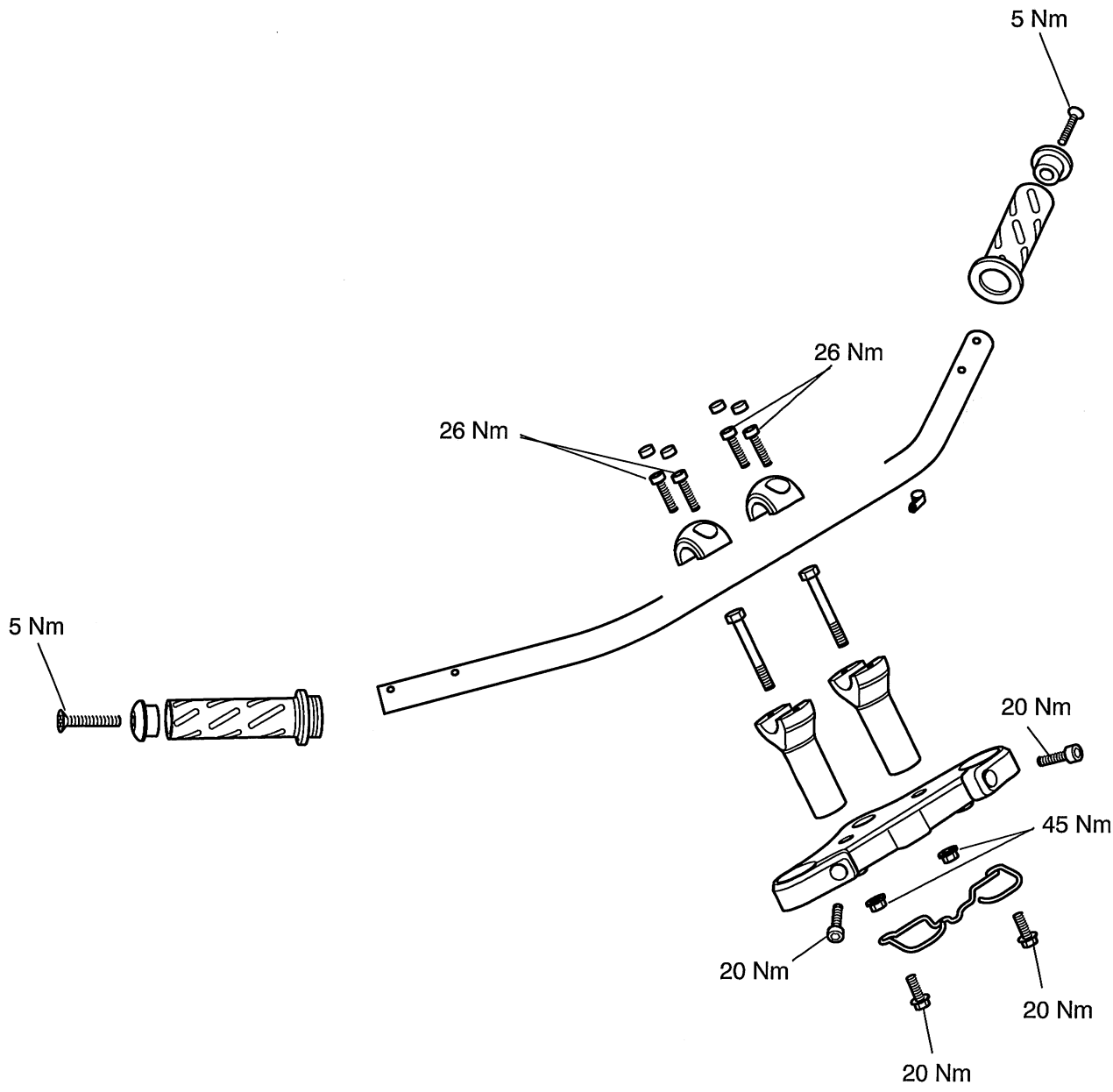
Exploded View

Handlebars - America



Exploded View

Handlebars - Speedmaster



GENERAL FRAME INSPECTION

1. Inspect the frame and footrests for damage, cracks, chafing and other dangerous conditions. Check all fixings for security.

WARNING: If the motorcycle is involved in an accident or collision it must be taken to an authorised Triumph dealer for inspection and repair.

WARNING: The frame must not be modified in any way. Any modification to the frame, such as welding or drilling, may weaken the structure causing an unsafe riding condition leading to loss of control and an accident.

2. Check the operation of the side stand and make sure it is securely held in the retracted position by the spring. Rectify any faults.

WARNING: If the spring is faulty, the side stand could extend whilst the motorcycle is being ridden. This will cause an unsafe riding condition which could lead to loss of control and an accident.

3. Inspect the bank angle pegs on the rider's footrests for wear. If more than 50% of the radiused end is worn away, they must be replaced.

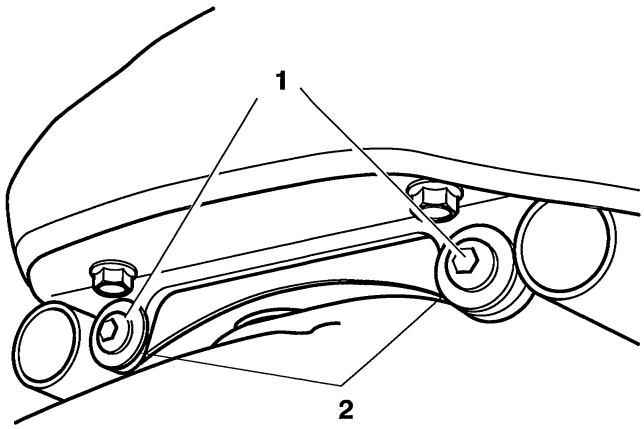
WARNING: The bank angle pegs must not be used as a guide to how far the motorcycle may be safely banked. This depends on many various conditions including, but not limited to, road surface, tyre condition and weather. Banking to an unsafe angle will lead to loss of control and an accident causing injury or death.

SEAT

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Thruxton only, if fitted remove the seat cowl.

2. Slacken and remove the retaining screws (and stepped sleeves if fitted) located at the rear of the seat.



T908.15.01

1. Seat screws

2. Stepped sleeves (if fitted)

2. Remove the seat.

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

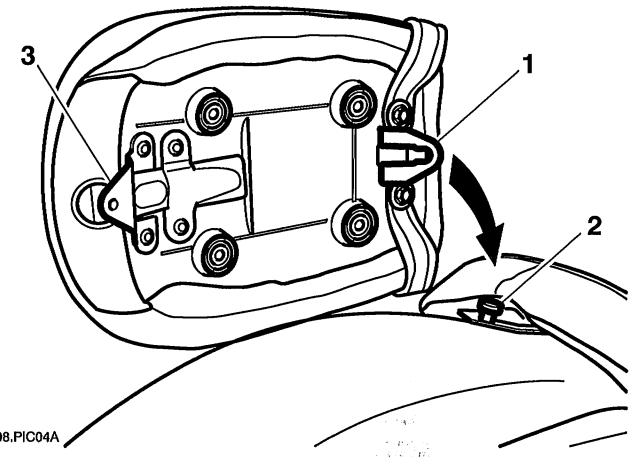
1. Fit the seat, ensuring it is correctly located behind the fuel tank, and tighten its retaining screws to **10 Nm.**

2. Thruxton only, refit the seat cowl. Tighten the fixings to **3 Nm.**

Removal - America

1. Slacken and remove the retaining screw located at the back of the rear seat.

2. Ease the rear seat forward to disengage its front bracket from the rim of the front seat fixing (see diagram below).



T908.PIC04A

1. Rear-seat front-bracket

2. Front seat fixing

3. Rear-seat rear-bracket

3. Remove the rear seat.

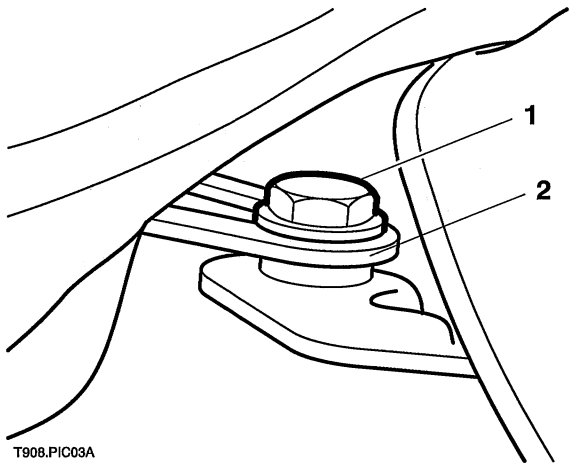
4. Slacken and remove the retaining screw located at the back of the front seat.

5. Remove the front seat.

Installation - America

1. Fit the front seat, ensuring it is correctly located behind the fuel tank, and tighten its retaining screw to **12 Nm.**

2. Locate the rear seat to the rear mudguard and position the front bracket into the rim in the head of the front seat fixing. Align the rear bracket to the mudguard and tighten its fixing to **10 Nm.**



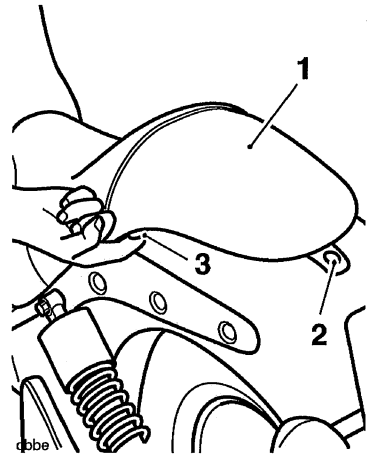
1. Front seat fixing

2. Rear-seat front-bracket

Removal - Speedmaster

1. Remove the fixing from the rear of the seat.

2. Pull the lock release outwards to release the centre of the seat then raise the seat from the rear and detach the front edge from the fuel tank.



1. Seat

2. Fastener

3. Lock release

Installation - Speedmaster

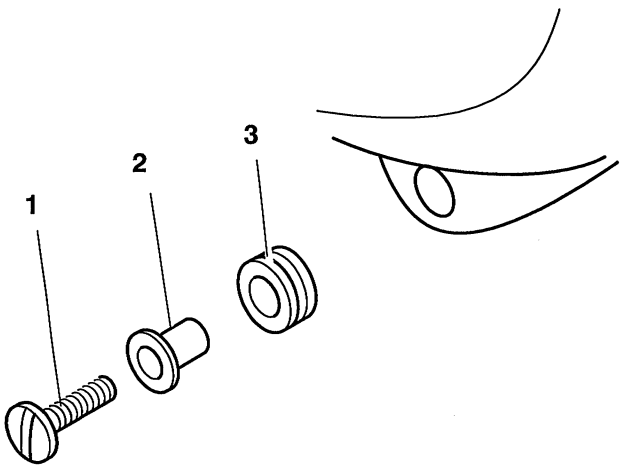
1. To refit, locate the seat to the frame ensuring the locating tongue is correctly positioned beneath the fuel tank bridge. Press firmly down to engage the centre of the seat in the seat lock

2. Finally, tighten the seat retaining screw to **10 Nm.**

SIDE COVER

Removal - Bonneville, Bonneville T100, Thruxton & Scrambler (left-hand side only)

1. Slacken and remove the cover retaining screw and collar.



1. Screw

2. Collar

3. Mounting rubber

2. Free the side cover from its upper mounting pegs and remove it from the bike.

3. Inspect the cover mounting rubbers for signs of damage or deterioration. Renew as necessary.

Installation - Bonneville, Bonneville T100, Thruxton & Scrambler (left-hand side)

1. Ensure the mounting rubbers are all correctly fitted.

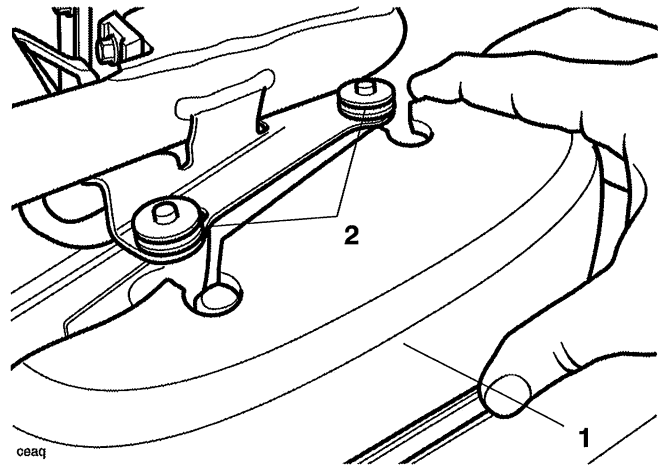
2. Install the cover, engaging its upper mounting rubbers with the mounting pegs.

3. Refit the cover retaining screw and collar and tighten securely.

SIDE COVER

Removal - Scrambler (right-hand side)

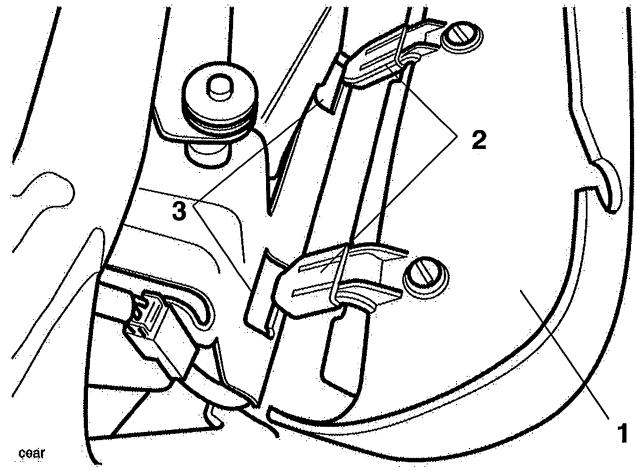
1. Pull the top of the cover free from its rubber mountings.



1. Right-hand side cover

2. Rubber mountings

2. Tilt the cover back and pull the legs of the cover free from their mounting points.



1. Left-hand side cover

2. Cover legs

3. Mounting points

Installation - Scrambler (right-hand side)

1. Position the legs of the cover into their mounting points.

2. Push the top of the cover onto its rubber mountings.

SIDE COVER

Removal - America & Speedmaster

1. The right hand side cover is retained by bayonets.

1. Cover

2. Bayonets

2. Free the side cover by gently pulling outwards.

Installation - America & Speedmaster

1. Ensure the mounting rubbers are all correctly fitted in the frame brackets and are in good condition.

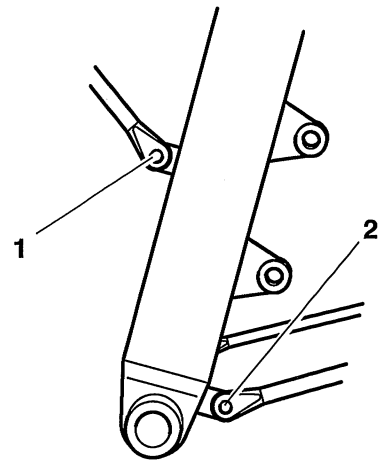
2. Install the cover, engaging its bayonet feet into the mounting rubbers.

FRONT MUDGUARD

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Remove the front wheel.

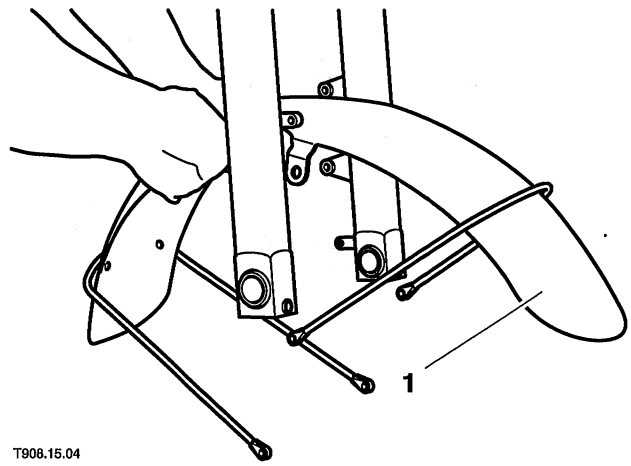
2. On Bonneville & Bonneville T100, undo the bolts securing the front and rear mounting stays to the fork legs.



1. Front stay bolt

2. Rear stay bolt

3. Undo the bolts securing the mudguard to the forks then remove the mudguard assembly from the motorcycle.



1. Front mudguard (Bonneville)

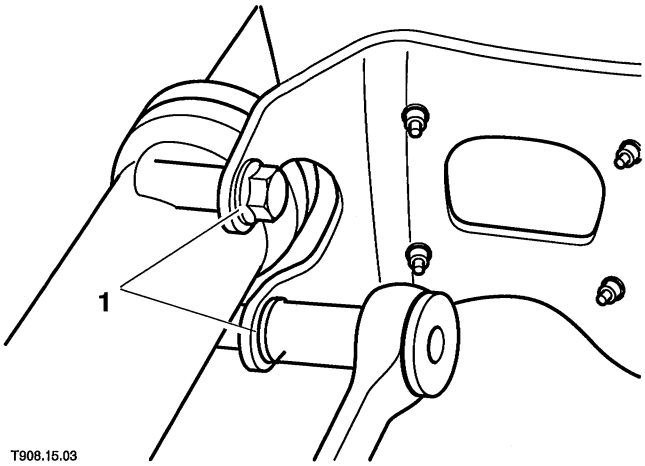
4. On Bonneville & Bonneville T100, if necessary, undo the bolts and separate the stays and mudguard, recovering the nylon spacer washers.

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Where necessary, assemble the mudguard and mounting stays, positioning the nylon washers between the stay and mudguard. Fit the bolts tightening them hand-tight only.

2. Manoeuvre the mudguard into position. Fit and hand-tighten all bolts then tighten the bolts securing the mudguard to the forks to **24 Nm.**

3. On Bonneville & Bonneville T100, tighten the stay bolts to **9 Nm.**



1. Mudguard to fork bolts

FRONT MUDGUARD

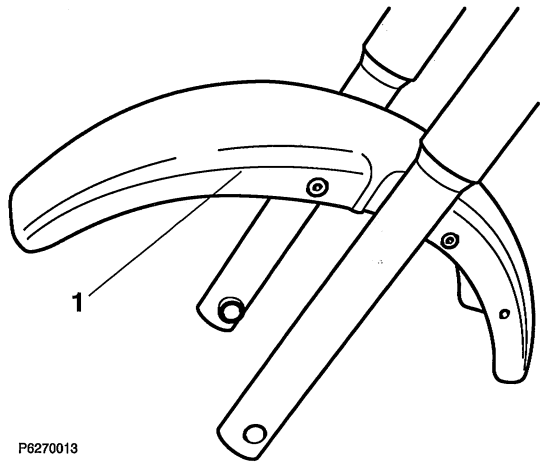
Removal - America & Speedmaster

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the front wheel as described in the wheel section.

2. Undo the bolts securing the mudguard bracket to the fork legs noting the location of the brake hose bracket beneath the head of the left hand rear bolt.

3. Remove the mudguard assembly from the motorcycle taking care not to damage the painted surface.



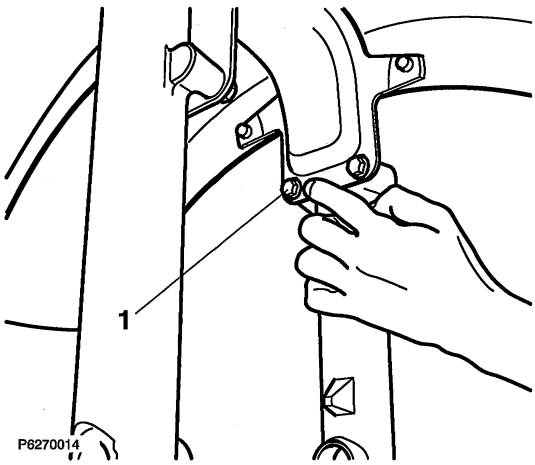
1. Front mudguard

4. If necessary, undo the bolts and separate the bracket and mudguard.

Installation - America & Speedmaster

1. Where necessary, assemble the mudguard and mounting bracket off the motorcycle. Tighten the fixings to **3 Nm.**

2. Manoeuvre the mudguard into position. Fit and hand-tighten all bolts locating the brake hose bracket beneath the head of the left hand rear fixing.



1. Brake hose bracket fixing point

3. Tighten the bolts securing the mudguard to the forks to **12 Nm.**

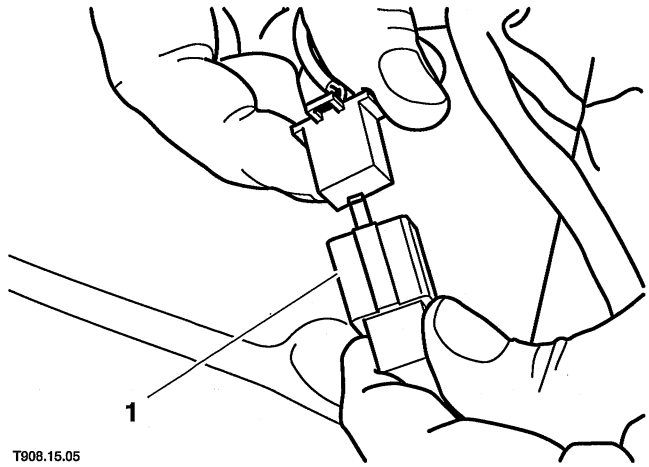
4. Refit the front wheel as described in the wheel section.

REAR MUDGUARD

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

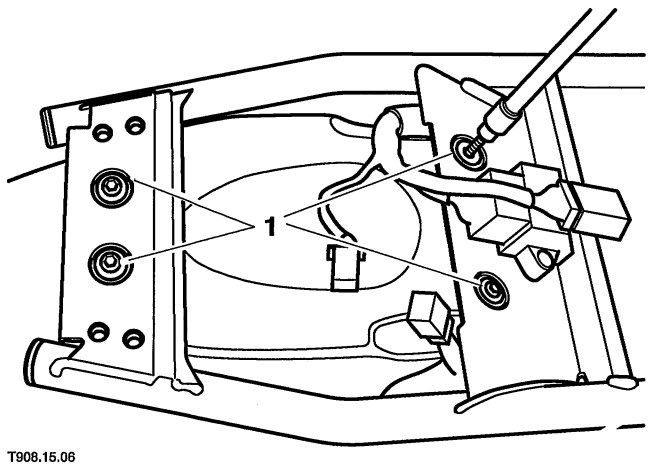
1. Remove the seat.

2. Trace the wiring back from the rear light assembly and disconnect its wiring connector from the main harness.



1. Rear light wiring connector

3. Unscrew the four screws and washers securing the mudguard assembly to the frame then remove the mudguard, complete with rear light.



1. Rear mudguard screws

Installation - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Ensure the rear light wiring is located in the clips on the underside of the mudguard and the grommet is located in the cutout on the mudguard front edge.

2. Manoeuvre the mudguard into position, taking care not to damage its painted finish. Locate the mudguard correctly in the rear of the airbox assembly then fit the washers and mounting screws, tightening them to **9 Nm.**

3. Reconnect the rear light wiring connector

4. Check the operation of the rear light and indicators then install the seat.

REAR MUDGUARD

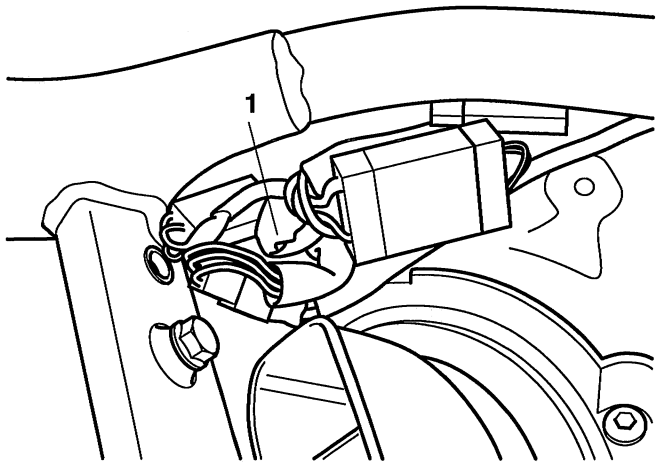
Removal - America & Speedmaster

1. Remove the seats.

2. Disconnect the battery, negative (black) lead first.

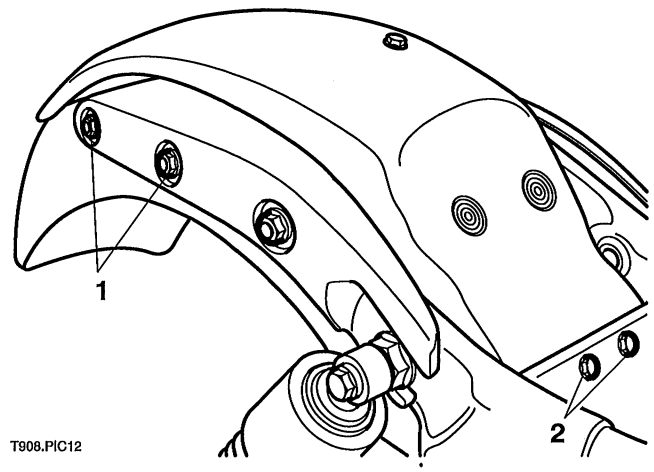
3. Remove the airbox top cover.

4. Disconnect the rear light and indicator wiring at their junctions with the main harness.



1. Rear light wiring connector location

5. Unscrew the four screws and washers securing the mudguard assembly to the frame brackets



1. Mudguard to bracket fixings

2. Mudguard to frame cross tube fixings

6. Unscrew the two screws securing the mudguard assembly to the frame cross tube

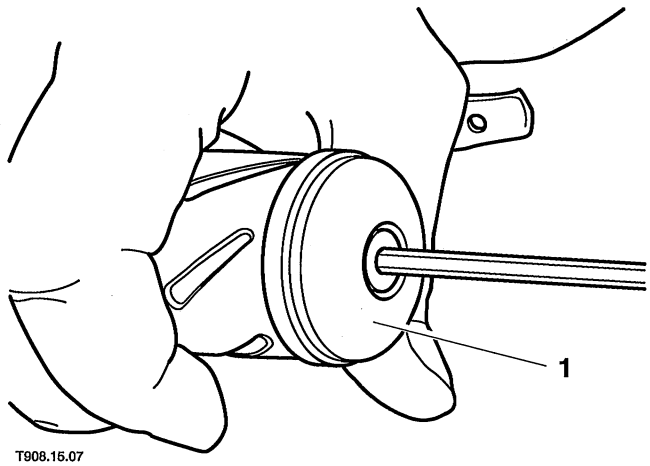
Installation - America & Speedmaster

1. Ensure the rear light wiring is located in the clips on the underside of the mudguard.
2. Manoeuvre the mudguard into position, taking care not to damage its painted finish.
3. Locate the mudguard correctly to its brackets then fit and tighten the six retaining screws and tighten to **26 Nm.**
4. Reconnect the rear light and indicator wiring.
5. Reconnect the battery, positive (red) lead first.
6. Check the operation of the rear light and indicators then install the seats.

HANDLEBAR - ALL MODELS EXCEPT THRUXTON

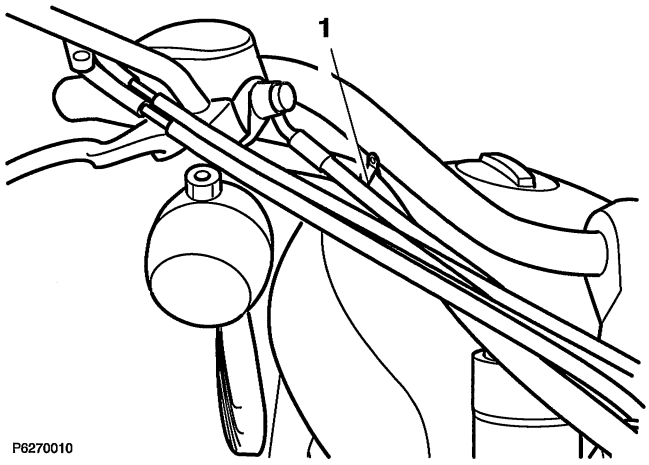
Removal

1. Undo the screws and remove the end weights from the handlebars.



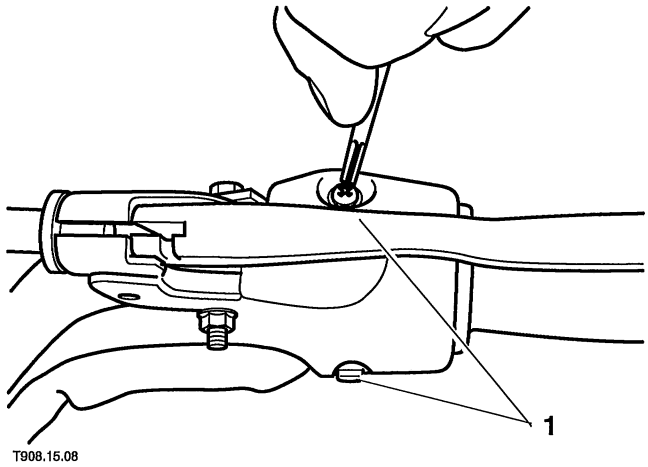
1. End weight

2. Release the wiring from its clips on either side of the handlebar.



1. Wiring clip (America shown)

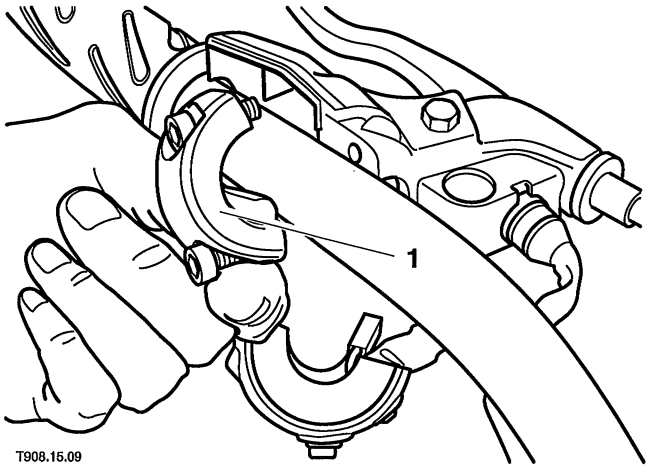
3. Undo the screws and free the left switchgear assembly from the handlebar.



T908.15.08

1. Switch screws

4. Unscrew the bolts and remove the mounting clamp from the clutch lever assembly. Position the lever clear.



T908.15.09

1. Mounting clamp

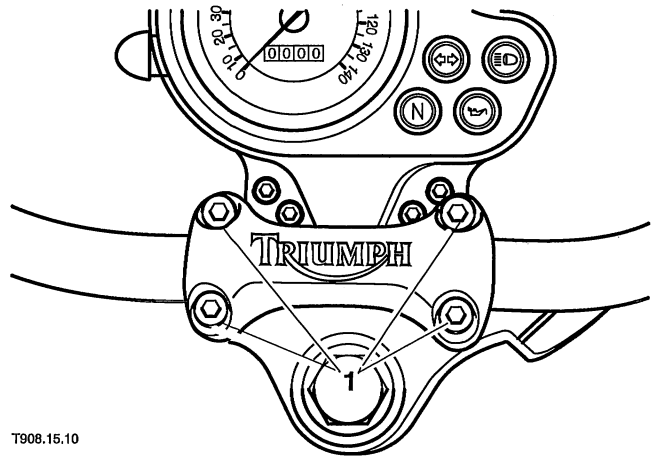
5. Undo the screws and free the right switchgear assembly from the master cylinder. Free the switch wiring from the handlebars.

6. Unscrew the bolts and remove the mounting clamp from the master cylinder.

7. Unscrew the bolts and lift off the handlebar upper clamp(s).

NOTE:

- **Ensure the master cylinder is securely supported so no strain is placed on the hydraulic hose/throttle cables.**



T908.15.10

1. Handlebar clamp bolts (Bonneville shown)

8. Free the handlebar from the twistgrip/master cylinder assembly and remove it from the motorcycle.

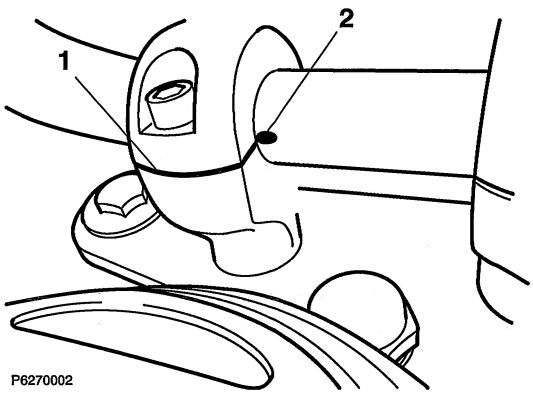
9. To remove a lower clamp, remove the nut, washer and lower mounting rubber from the base of the top yoke then lift off the clamp, upper mounting rubber, bolt and spacer.

Installation

1. Fit the upper mounting rubber and bolt to the lower clamp and fit the clamp to the top yoke. Fit the spacer, lower mounting rubber and washer then fit the nut and tighten to **35 Nm.**

2. Fit the throttle twistgrip assembly then locate the handlebars in the lower clamps. Lubricate the threads of the clamp bolts with clean engine oil then fit the upper clamp and bolts.

3. **Bonneville & Bonneville T100** - align the punch marks on the bar with the front splits of the clamps then evenly tighten the clamp bolts to **26 Nm. America & Speedmaster** - align the punch mark on the bar with the rear split of the left hand clamp then evenly tighten the clamp bolts to **26 Nm.**

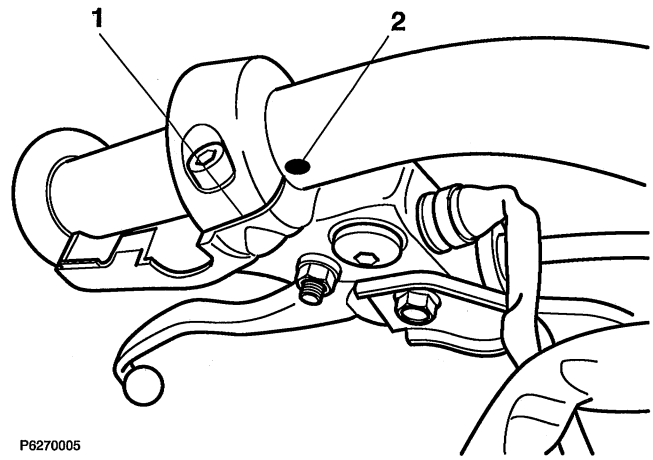


P6270002

1. Clamp split line (America shown)

2. Handlebar punch mark

4. Locate the clutch lever assembly on the handlebar and fit the mounting clamp.
America - align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**
Bonneville, Bonneville T100 & Speedmaster - align the clamp upper split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**



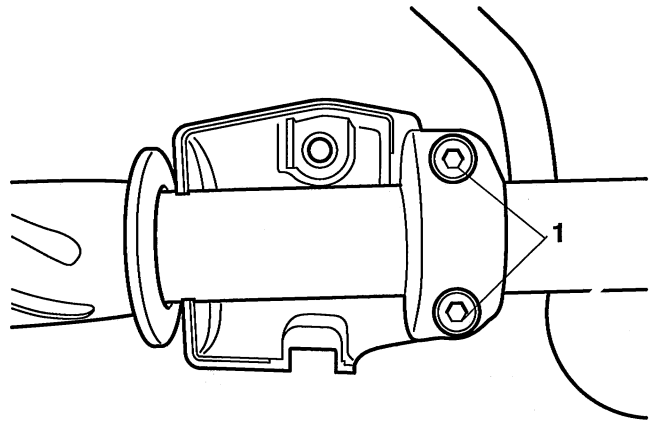
P6270005

1. Clamp split line

2. Handlebar dot mark

NOTE:

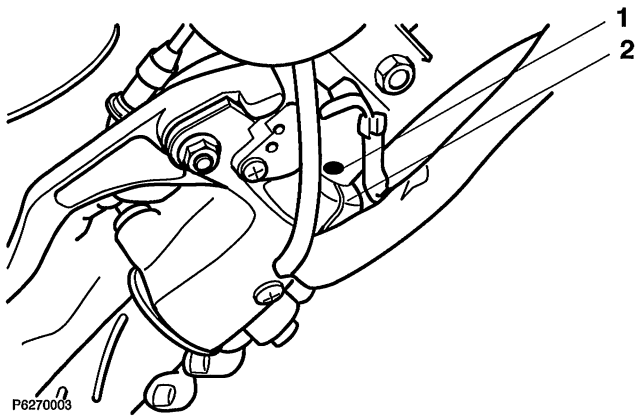
- **America punch mark illustrated**



P6270006

1. Clutch lever clamp bolts

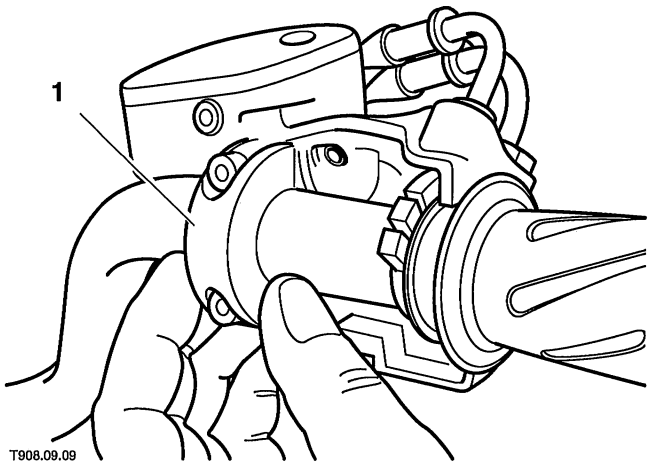
5. Fit the mounting clamp to the master cylinder.
America - align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**
Bonneville, Bonneville T100 & Speedmaster - align the clamp upper split with the punch mark on the handlebar then evenly tighten the clamp bolts to **15 Nm.**



1. Handlebar dot mark
2. Clamp split line

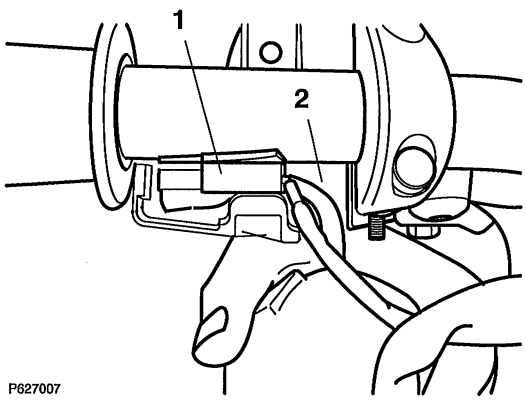
NOTE:

- **America punch mark illustrated**



1. Master cylinder mounting clamp

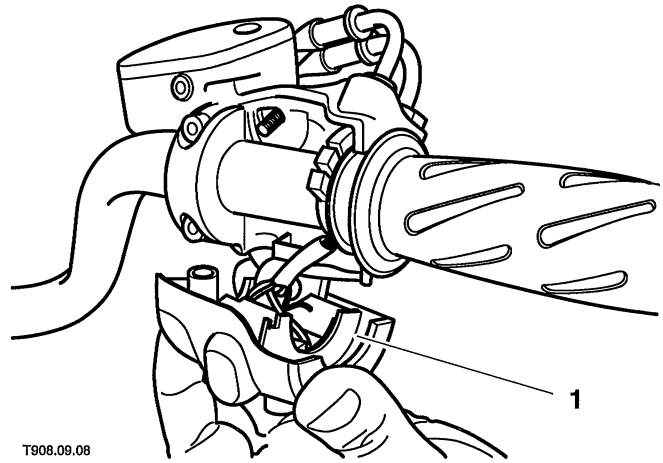
6. On America & Speedmaster, tuck the indicator wiring connectors into the recess in the front half of the switchgear.



1. Cable connector

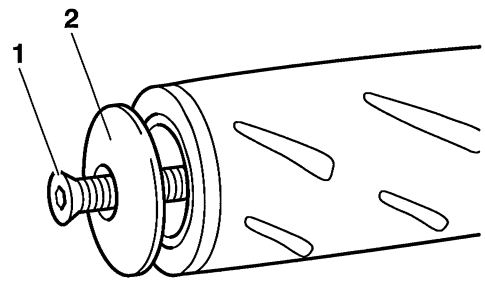
2. Recess

7. Refit the left and right switchgear assemblies, tightening their screws to **2 Nm.**



1. Right-hand switchgear assembly

8. Insert the handlebar end weights into the handlebar ends and secure with the two M5x30 mm fixings. Tighten to **5 Nm.**



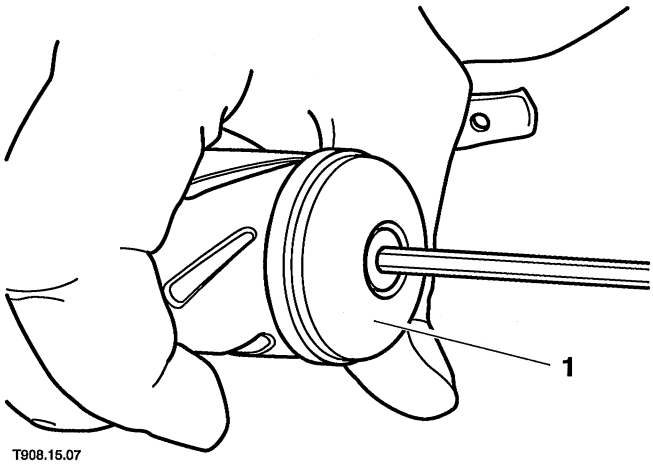
1. Fixing

2. End weight

HANDLEBAR - SCRAMBLER ONLY

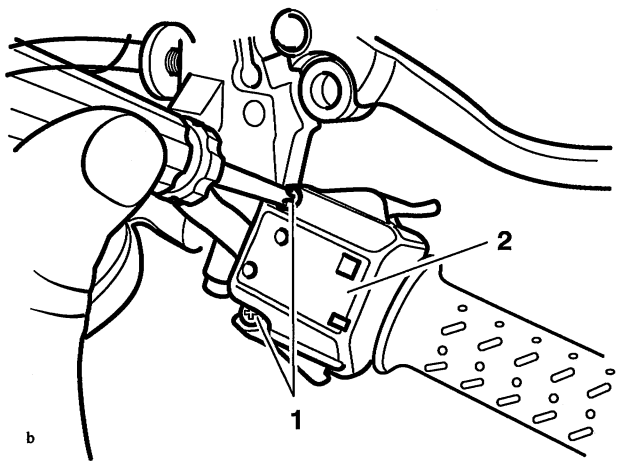
Removal

1. Undo the screws and remove the end weights from the handlebars.



1. End weight

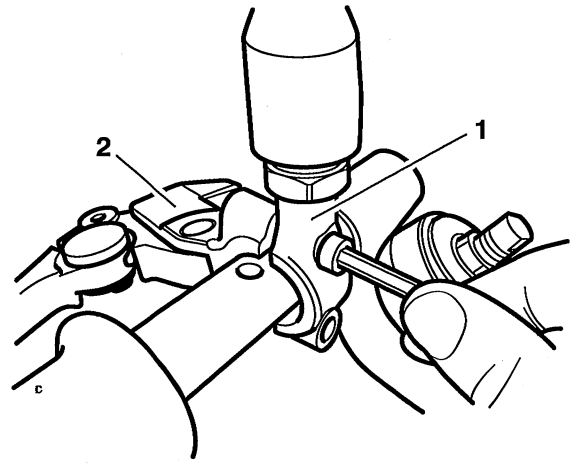
2. Undo the screws and free the left hand switch cube assembly from the handlebar. Free the wiring from the handlebar.



1. Switch cube screws

2. Switch cube

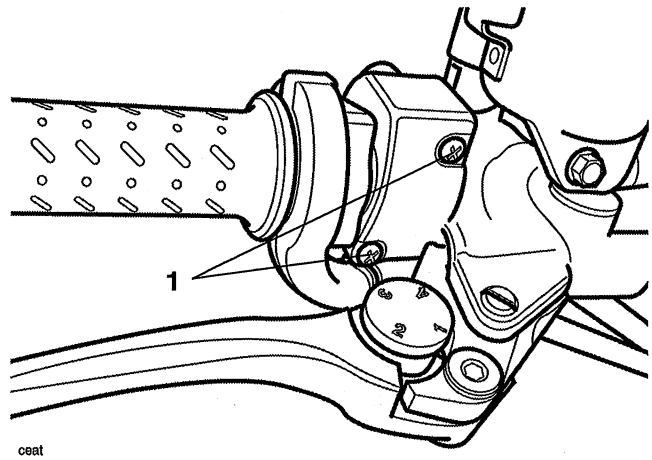
3. Unscrew the bolts and remove the clutch lever assembly together with the clamp/mirror from the handlebar.



1. Clamp/mirror

2. Clutch lever assembly

4. Undo the fixings and remove the right hand switch cube assembly from the handlebar.

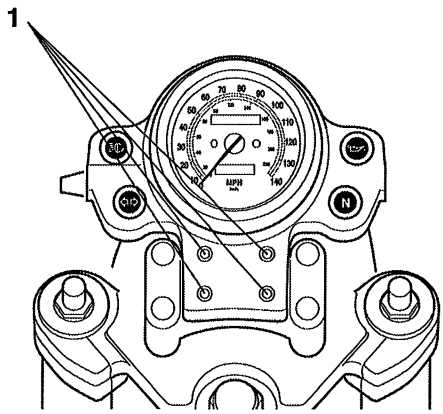


1. Switch cube fixings

5. Slacken but do not remove the twistgrip fixings.

6. Unscrew the bolts and remove the mounting clamp from the master cylinder. Support both the master cylinder assembly and the reservoir ensuring that the reservoir is supported in an upright position.

7. Unscrew the screws securing the instruments to the handlebar clamp. Support the instruments clear of the handlebars.



1. Instrument screws

8. Unscrew the bolts and lift off the handlebar clamp.

9. Free the handlebar from the twist grip assembly and remove it from the motorcycle.

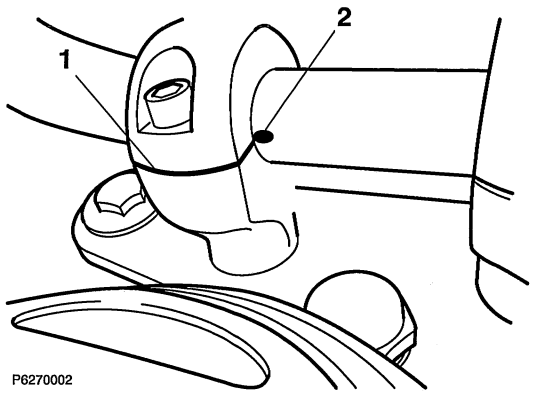
10. To remove a lower clamp, remove the nut, washer and lower mounting rubber from beneath the top yoke then lift off the clamp, upper mounting rubber, bolt and spacer.

Installation

1. Fit the upper mounting rubber and bolt to the lower clamp and fit the clamp to the top yoke. Fit the spacer, lower mounting rubber and washer then fit the nut and tighten to **35 Nm**.

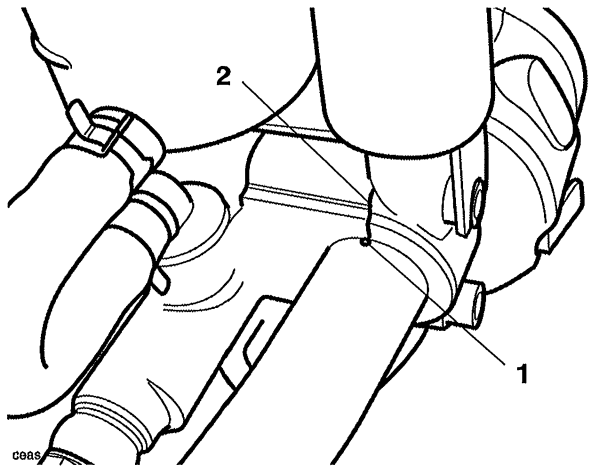
2. Fit the throttle twistgrip assembly then locate the handlebars in the lower clamps. Lubricate the threads of the clamp bolts with clean engine oil then fit the upper clamp and bolts.

3. Align the punch mark on the bar with the rear split of the left hand clamp then evenly tighten the clamp bolts to **26 Nm**.



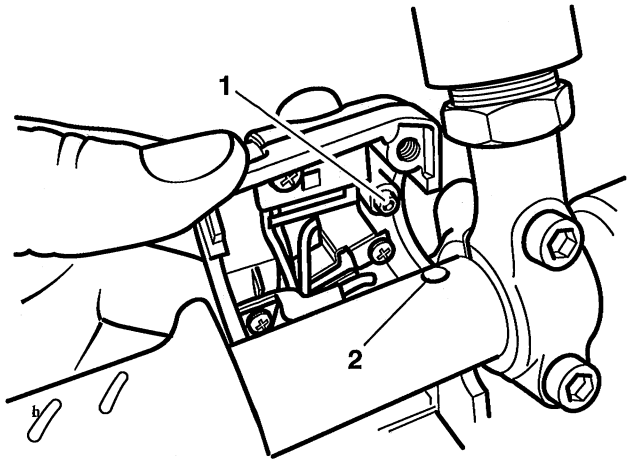
1. Clamp split line
2. Handlebar punch mark

4. Locate the clutch lever assembly on the handlebar and fit the clamp/mirror. Align the clamp/mirror split line with the punch mark on the handlebar. Evenly tighten the clamp bolts to **15 Nm.**



1. Handlebar punch mark
2. Clamp/mirror split line

5. Position the left hand switch gear to the handlebar, ensure that the tab on the upper switch gear half locates with the hole in the handlebar.

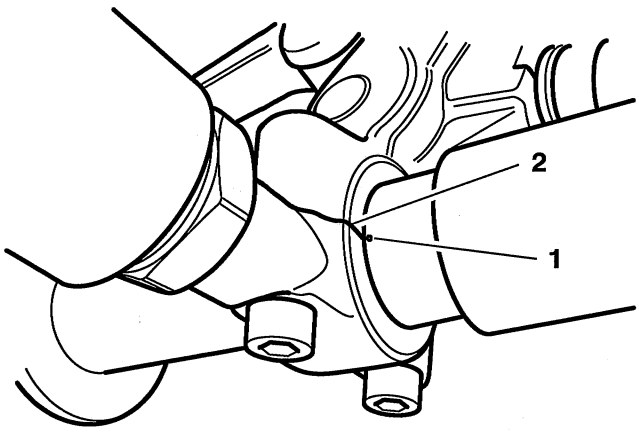


1. Tab

2. Locating hole

6. Secure the lower switch gear half to the upper. Tighten the fixings to **2 Nm.**

7. Locate the brake master cylinder assembly on the handlebar and fit the clamp/mirror. Align the clamp/mirror upper split line with the punch mark on the handlebar. Evenly tighten the clamp bolts to **15 Nm.**



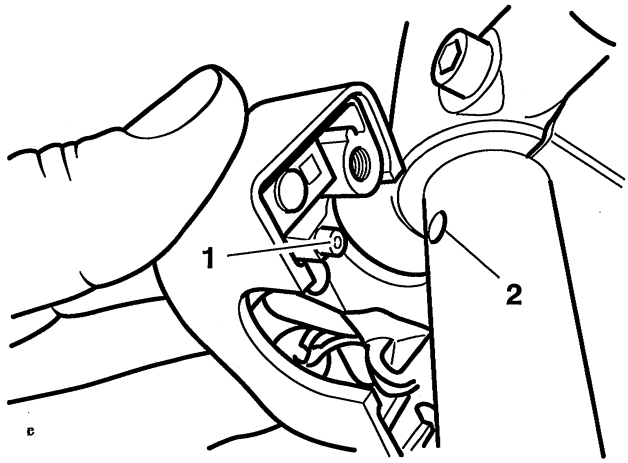
1. Handlebar punch mark

2. Clamp/mirror split line

8. Tighten the fixings securing the throttle grip to **6 Nm.**

9. Secure the front brake fluid reservoir to the master cylinder. Tighten the fixing to **9 Nm.**

10. Position the right-hand switch gear to the handlebar, ensure that the tab on the upper switch gear half locates with the hole in the handlebar.

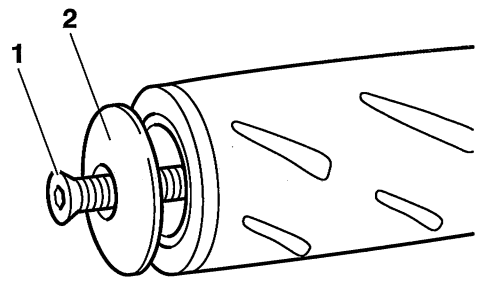


1. Tab

2. Locating hole

11. Secure the lower switch gear half to the upper. Tighten the fixings to **2 Nm.**

12. Insert the handlebar end weights into the handlebar ends and tighten the fixings to **5 Nm.**



P6270008

1. Fixing

2. End weight

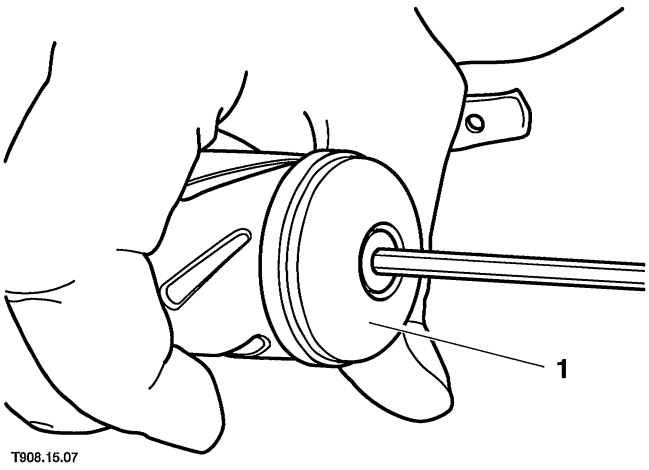
HANDLEBAR - THRUXTON ONLY

Removal

NOTE:

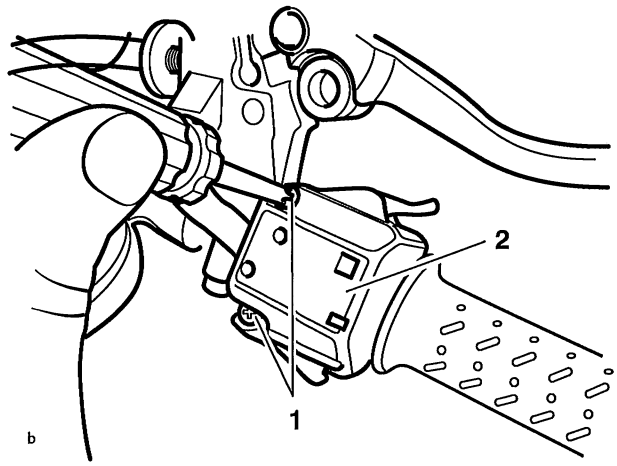
- **The left hand and right hand handlebars can be removed independently.**

1. Undo the screws and remove the end weights from the handlebars.



1. End weight

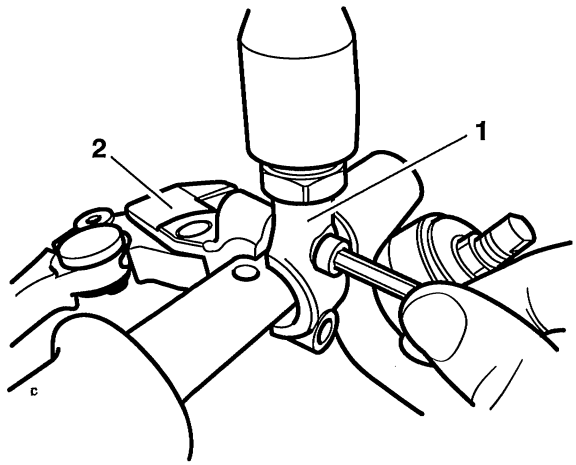
2. Undo the screws and free the left hand switch gear assembly from the handlebar. Free the wiring from the handlebar.



1. Switchcube screws

2. Switchcube

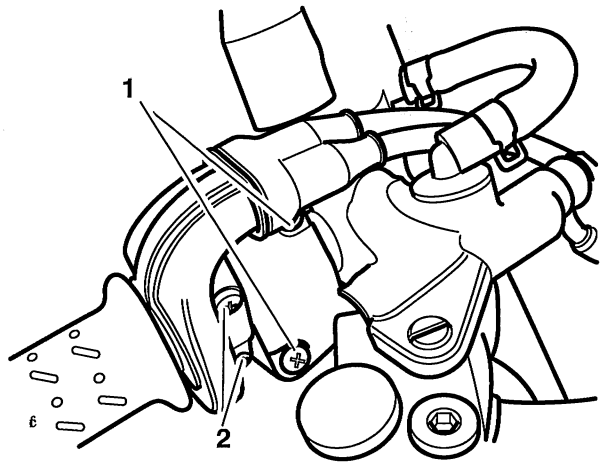
3. Unscrew the bolts and remove the clutch lever assembly together with the clamp/mirror from the handlebar.



1. Clamp/mirror

2. Clutch lever assembly

4. Undo the fixings and remove the right hand switch gear assembly from the handlebar.

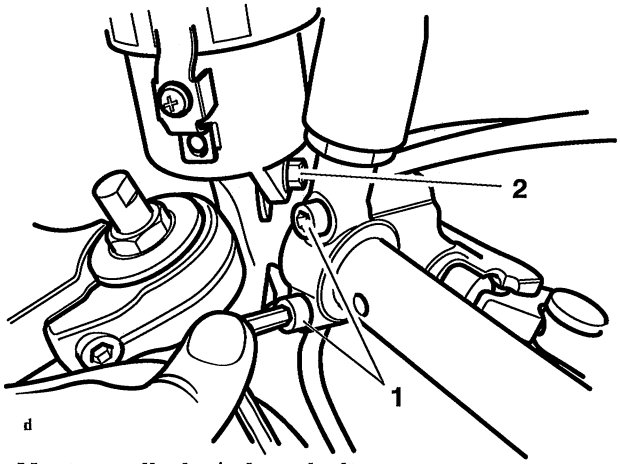


1. Switchgear fixings

2. Twist grip fixings.

5. Slacken but do not remove the twistgrip fixings.

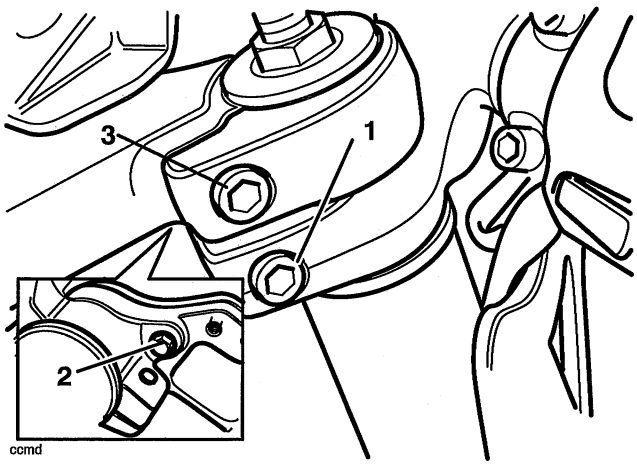
6. Undo and remove the master cylinder/mirror bolts and the front brake fluid reservoir fixing. Support both the master cylinder assembly and the reservoir ensuring that the reservoir is supported in an upright position.



1. Master cylinder/mirror bolts

2. Brake fluid reservoir fixing

7. Slacken the top yoke clamp bolts and the handlebar clamp bolts.



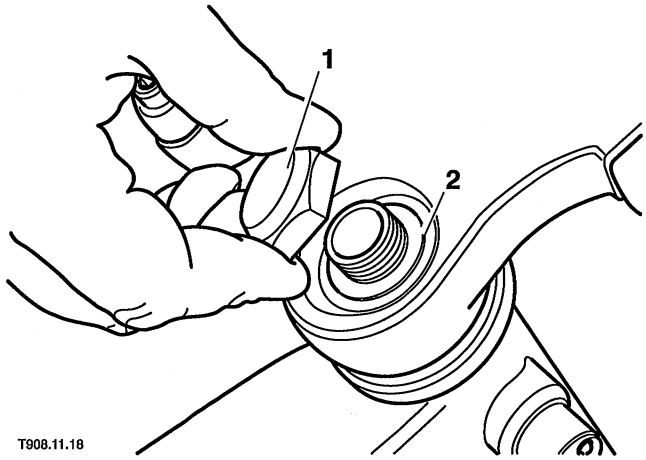
1. Handlebar clamp bolt

2. Handlebar locating bolt

3. Top yoke clamp bolt

8. Slacken and remove the handlebar locating bolts.

9. Slacken and remove the top nut and washer from the steering stem. Lift off the top yoke assembly and position it clear.



1. Top nut

2. Washer

10. Remove the right hand handlebar from the fork and slide the throttle twist grip assembly free.

11. Remove the left hand handlebar from the fork.

Installation

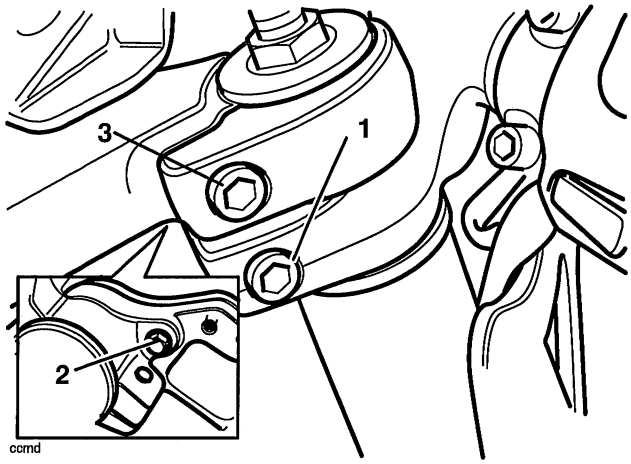
1. Slide the throttle twist grip onto the right hand handlebar and Position the handlebar on the fork.

2. Position the left hand handlebar on the fork.

2. Refit the top yoke assembly together with the washer and top nut. Tighten the top nut to **90 Nm.**

3. Tighten the top yoke clamp bolts to **27 Nm.**

4. Align both handlebars to allow insertion of the handlebar locating bolts. Tighten the bolts to **11 Nm.**



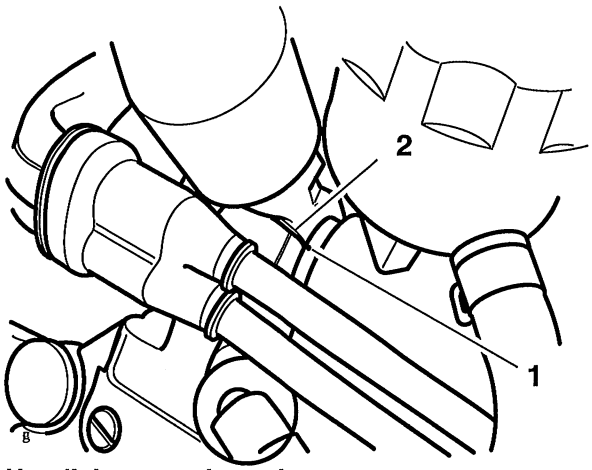
1. Handlebar clamp bolt

2. Handlebar locating bolt

3. Top yoke clamp bolt

5. Tighten the handlebar clamp bolts to **27 Nm.**

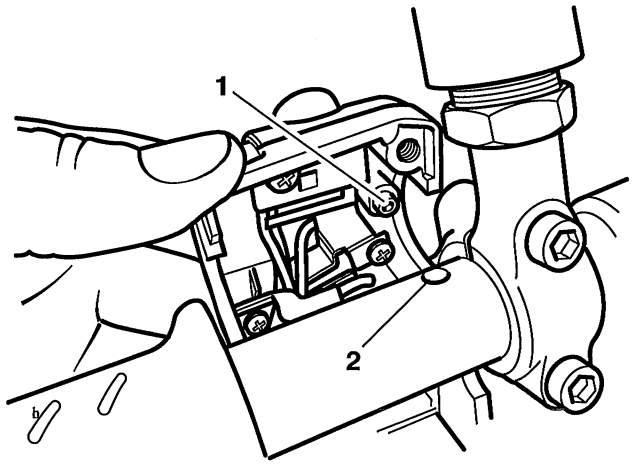
6. Locate the clutch lever assembly on the handlebar and fit the clamp/mirror. Align the clamp/mirror upper split line with the punch mark on the handlebar. Evenly tighten the clamp bolts to **15 Nm.**



1. Handlebar punch mark

2. Clamp/mirror split line

7. Position the left hand switch gear to the handlebar, ensure that the tab on the upper switch gear half locates with the hole in the handlebar.

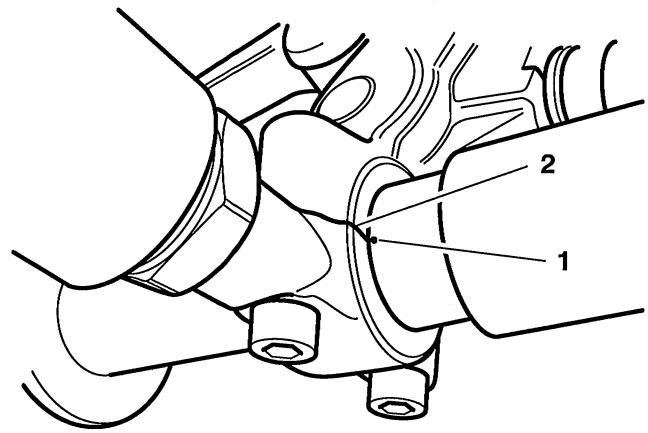


1. Tab

2. Locating hole

8. Secure the lower switch gear half to the upper. Tighten the fixings to **2 Nm.**

9. Locate the front master cylinder assembly on the handlebar and fit the clamp/mirror. Align the clamp/mirror upper split line with the punch mark on the handlebar. Evenly tighten the clamp bolts to **15 Nm.**



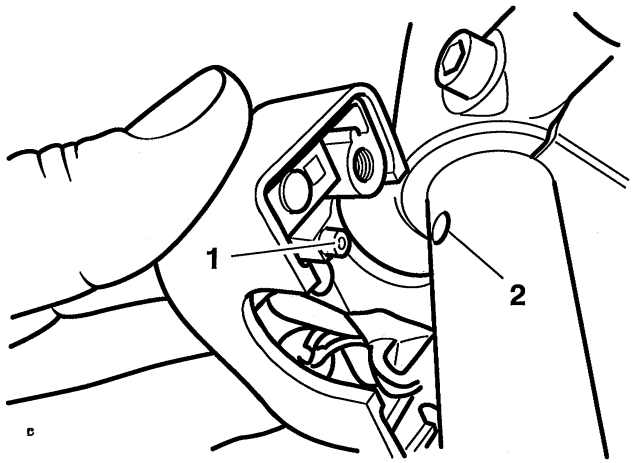
1. Handlebar punch mark

2. Clamp/mirror split line

10. Position the throttle grip assembly so that the throttle cables do not rub against the mirror or the master cylinder. Tighten the fixings to **6 Nm.**

11. Secure the front brake fluid reservoir to the handlebar. Tighten the fixing to **9 Nm.**

12. Position the right switch gear to the handlebar, ensure that the tab on the upper switch gear half locates with the hole in the handlebar.

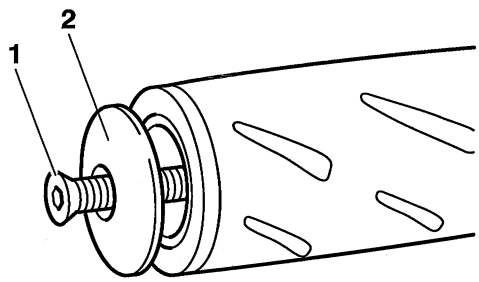


1. Tab

2. Locating hole

13. Secure the lower switch gear half to the upper. Tighten the fixings to **2 Nm.**

14. Insert the handlebar end weights into the handlebar ends and tighten the fixings to **5 Nm.**



P6270008

1. Fixing

2. End weight

SIDE STAND - ALL MODELS

Removal

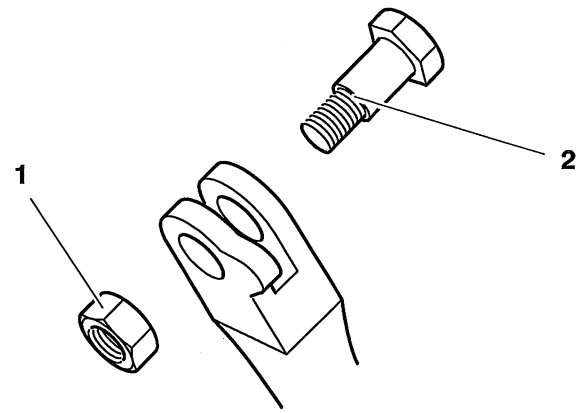
1. Securely raise and support the motorcycle.

WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

2. Unhook the spring from the side stand and remove it from the motorcycle.

WARNING: Wear hand, eye and face protection when unhooking the stand spring. Take great care to minimise the risk of personal injury and loss of components.

3. Unscrew the nut from the side stand pivot bolt.



1. Nut
2. Pivot bolt

4. Unscrew the pivot bolt and remove the stand from the bike.

Installation

1. Lubricate the pivot bolt shoulder and side stand pivot with multi-purpose grease.
2. Fit the stand to the bike and insert the pivot bolt, tightening it **20 Nm**.
3. Fit the locknut to the pivot bolt and tighten it to **25 Nm**.
4. Hook the spring onto its frame lug then carefully hook it onto the stand lug.

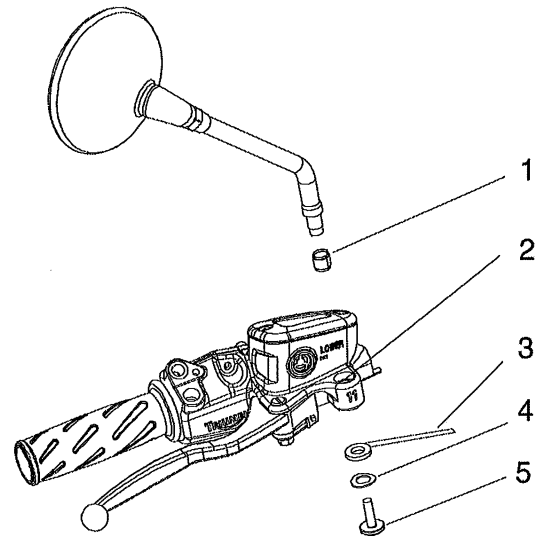
> **WARNING: Wear hand, eye and face protection when fitting the stand spring. Take great care to minimise the risk of personal injury and loss of components.**

5. Check the operation of the side stand before riding the motorcycle. Ensure the spring holds the stand securely in the retracted position.

MIRRORS - ALL EXCEPT THRUXTON & SCRAMBLER

Removal

1. Remove the mirror screw and collect the wavy washer.
2. Using a twisting action, remove the mirror in an upwards direction.
3. Remove and discard the tolerance ring.



1. Tolerance ring
2. Mirror mounting location
3. Wavy washer
5. Tool T3880007
4. Mirror screw

Installation

1. Push a new tolerance ring into the recess in the mirror mounting location.
2. Insert the mirror into the tolerance ring.
3. Working from below the mirror, carefully position Triumph service tool T3880007 centrally over the mirror stem bore with the handle of the tool angled downwards.
4. Fit and tighten the mirror screw to **10 Nm** whilst ensuring that the tolerance ring is drawn evenly into the mirror stem bore.
5. Remove the screw and tool. Ensure that the mirror stem has approximately 1.5 mm pull through visible underneath the mirror stem bore.
6. Fit the wavy washer and re-tighten the mirror screw to **10 Nm.**

ELECTRICAL & IGNITION SYSTEMS

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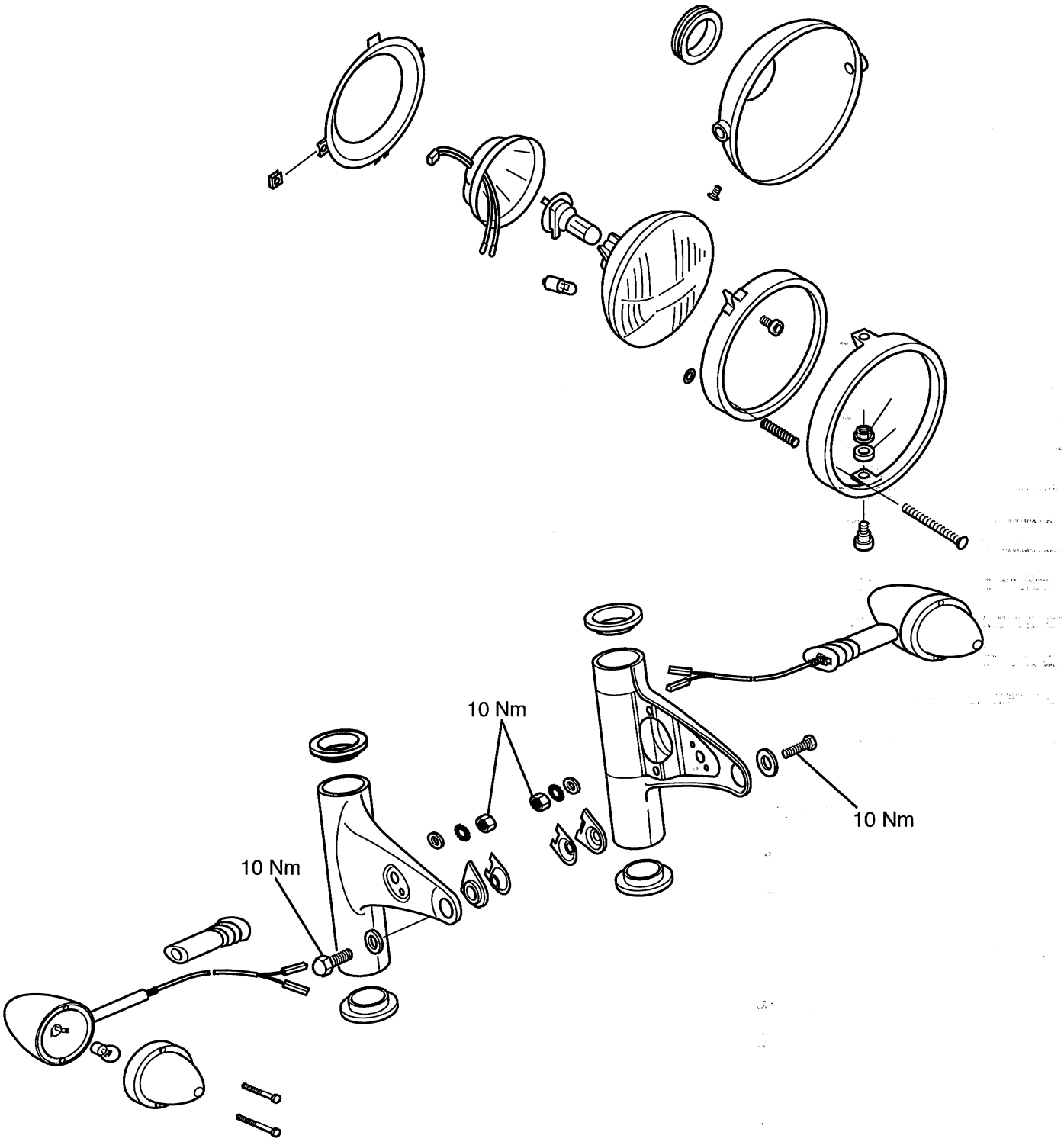
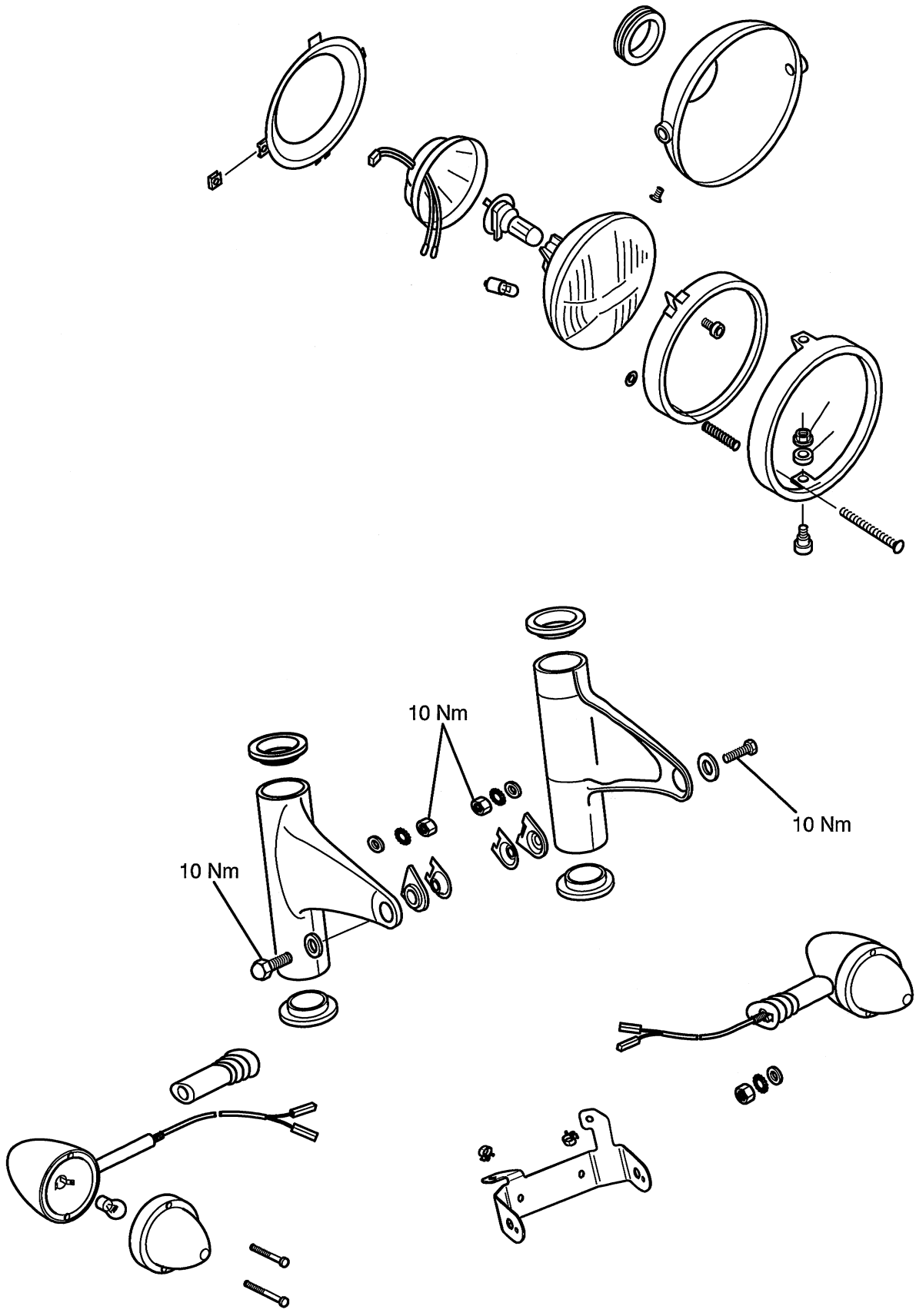
Exploded View

Headlight and Front Indicators - Bonneville, Bonneville T100



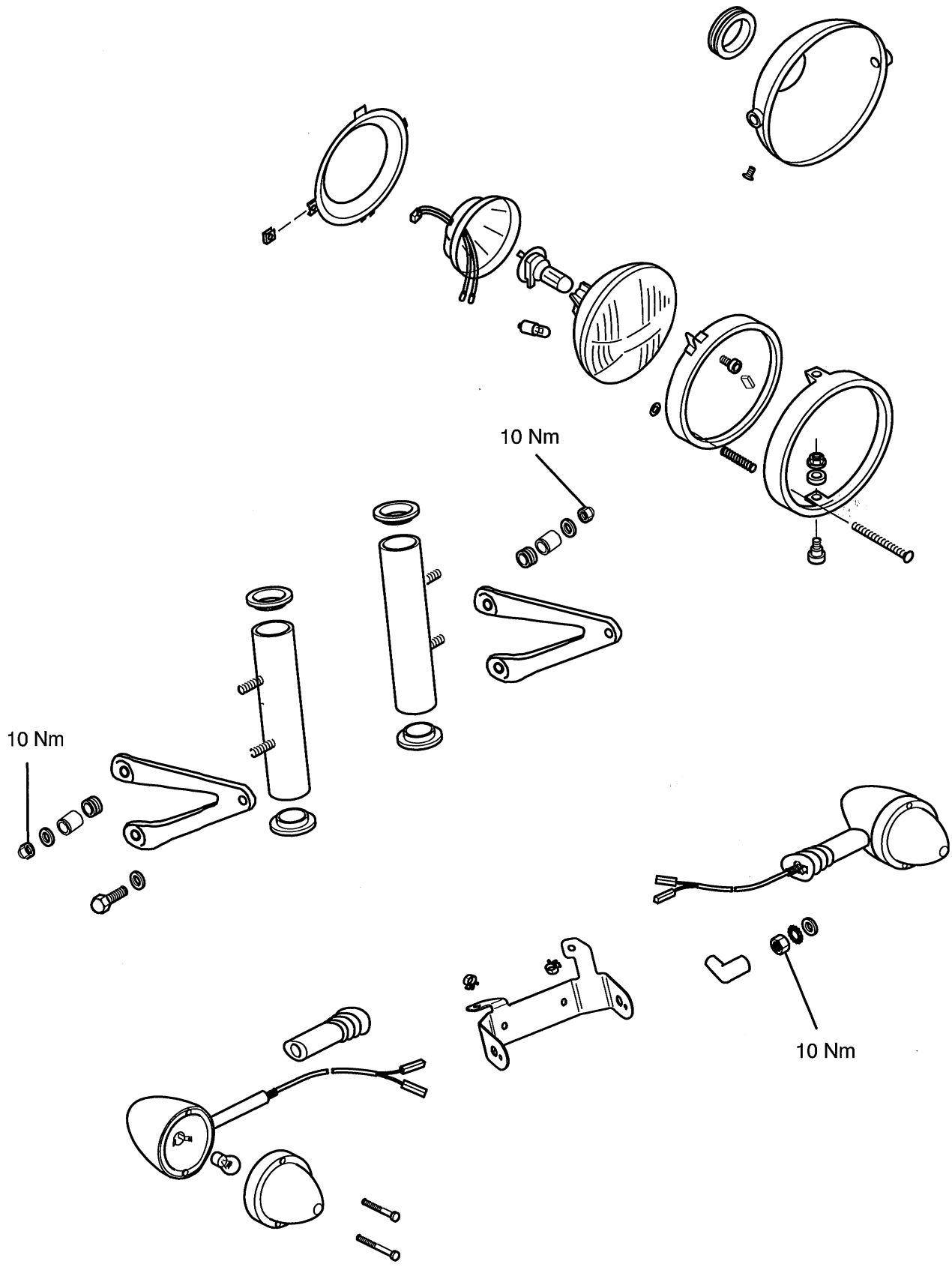
Exploded View

Headlight and Front Indicators - Scrambler



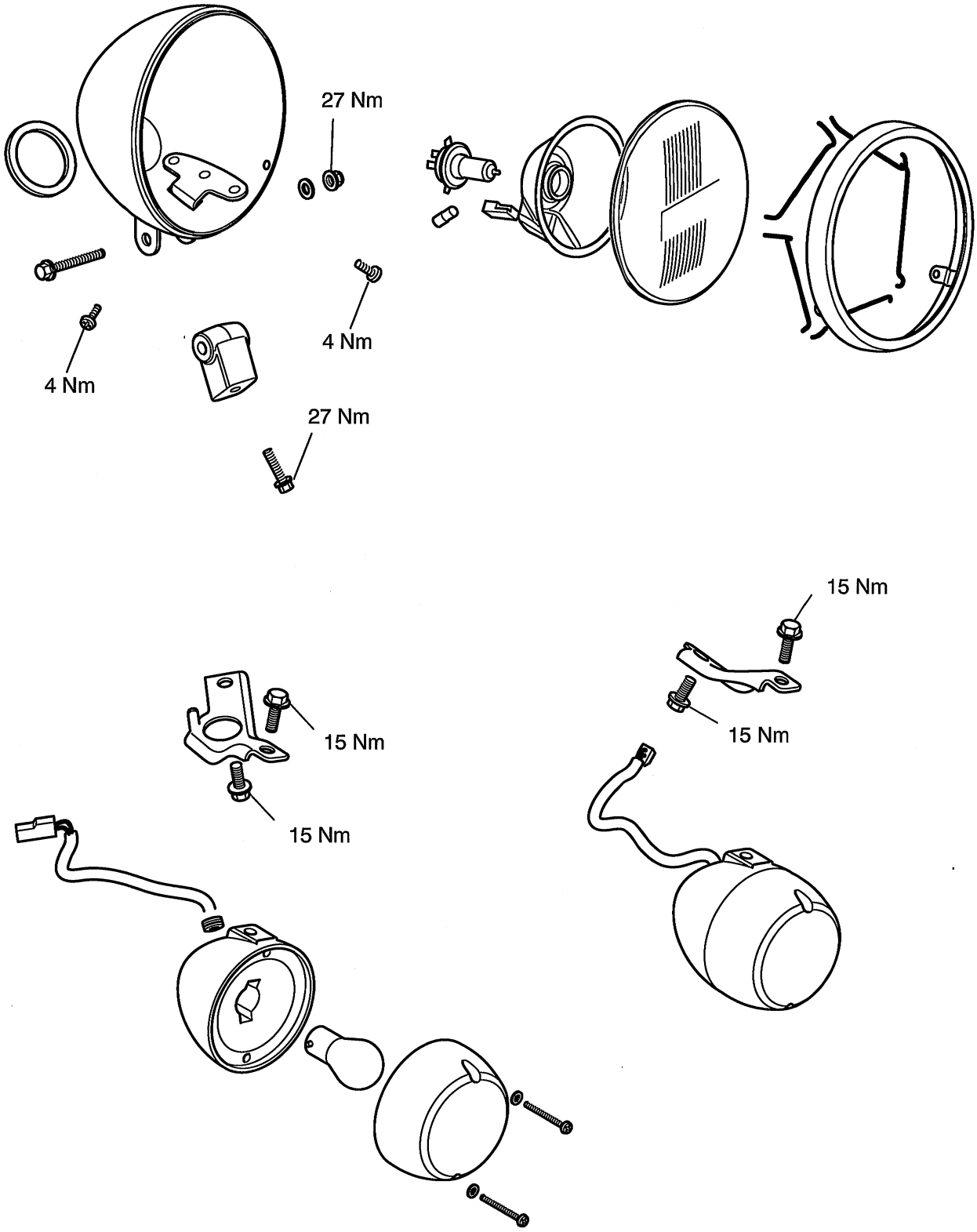
Exploded View

Headlight and Front Indicators - Thruxton



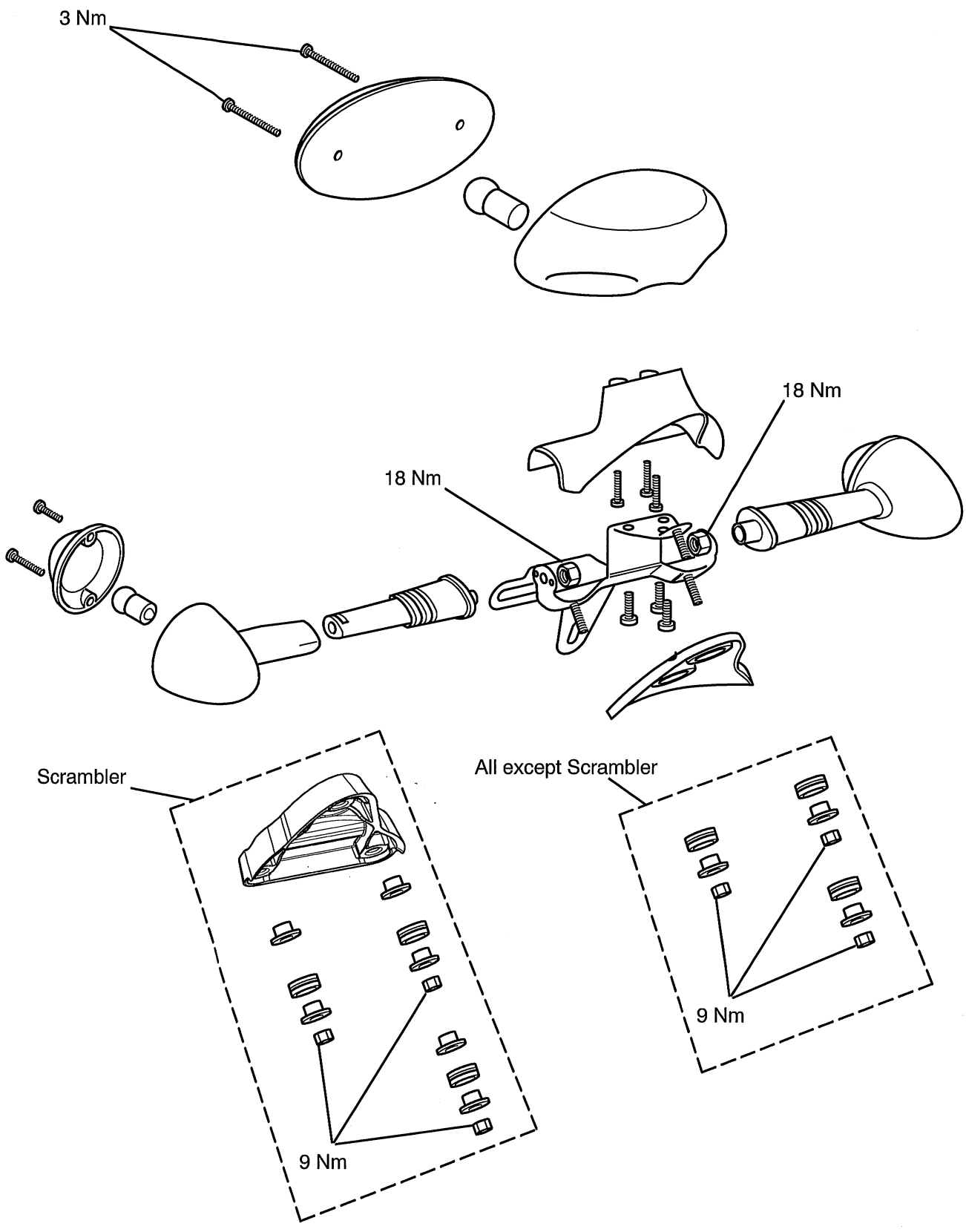
Exploded View

Headlight and Front Indicators - America & Speedmaster



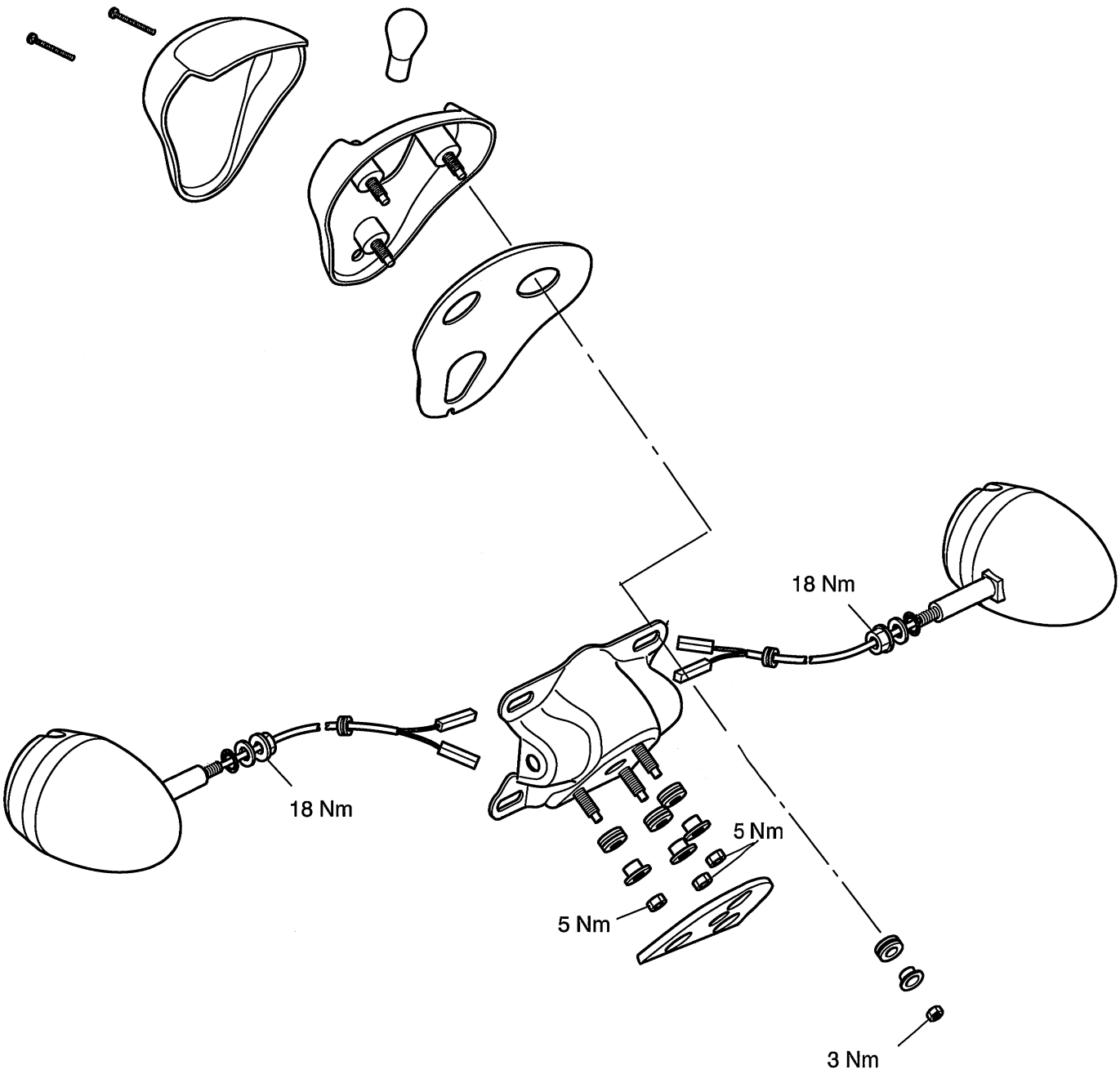
Exploded View

Rear Light and Rear Indicators - Bonneville, Bonneville T100, Scrambler & Thruxton



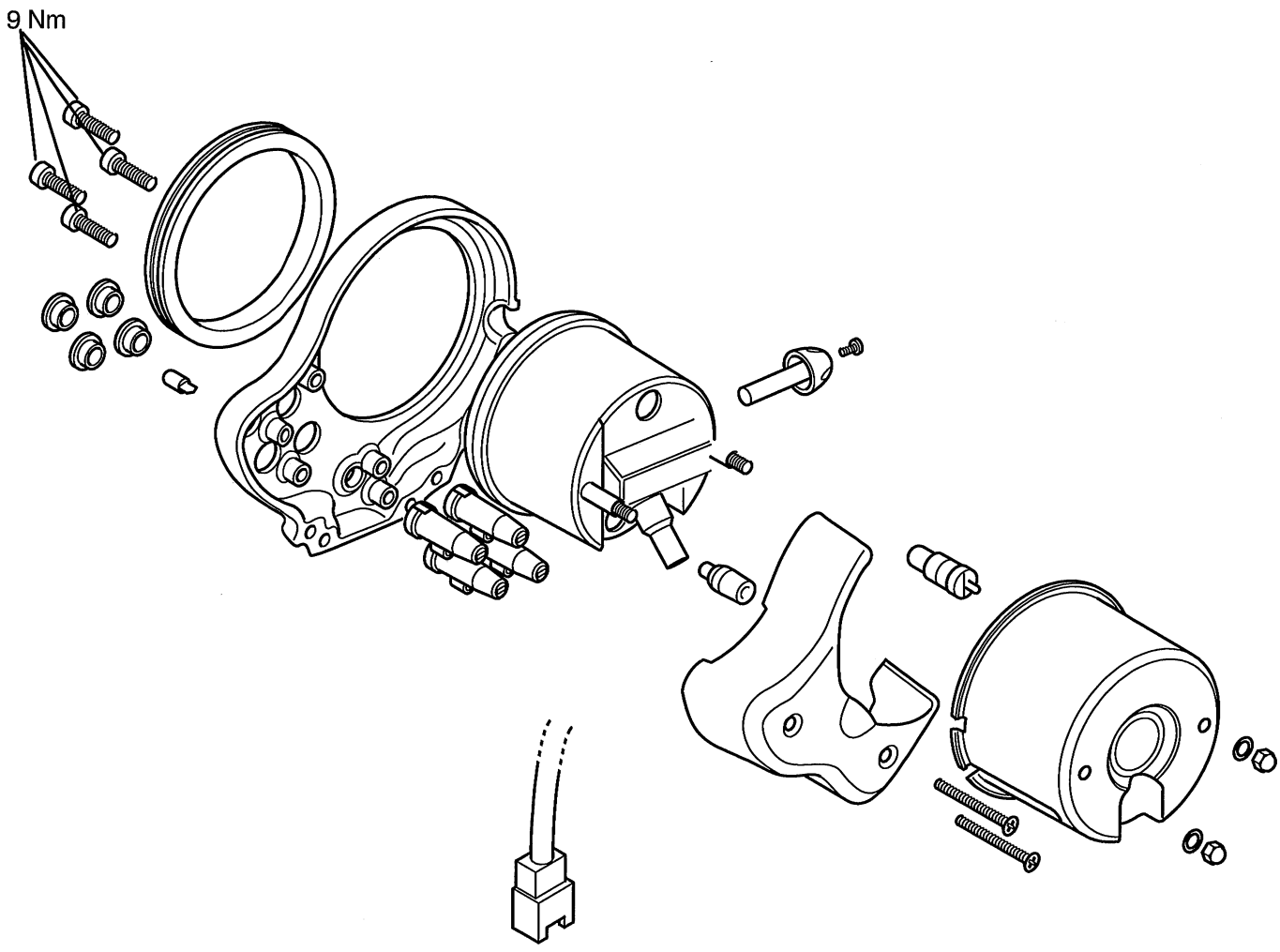
Exploded View

Rear Light and Rear Indicators - America & Speedmaster



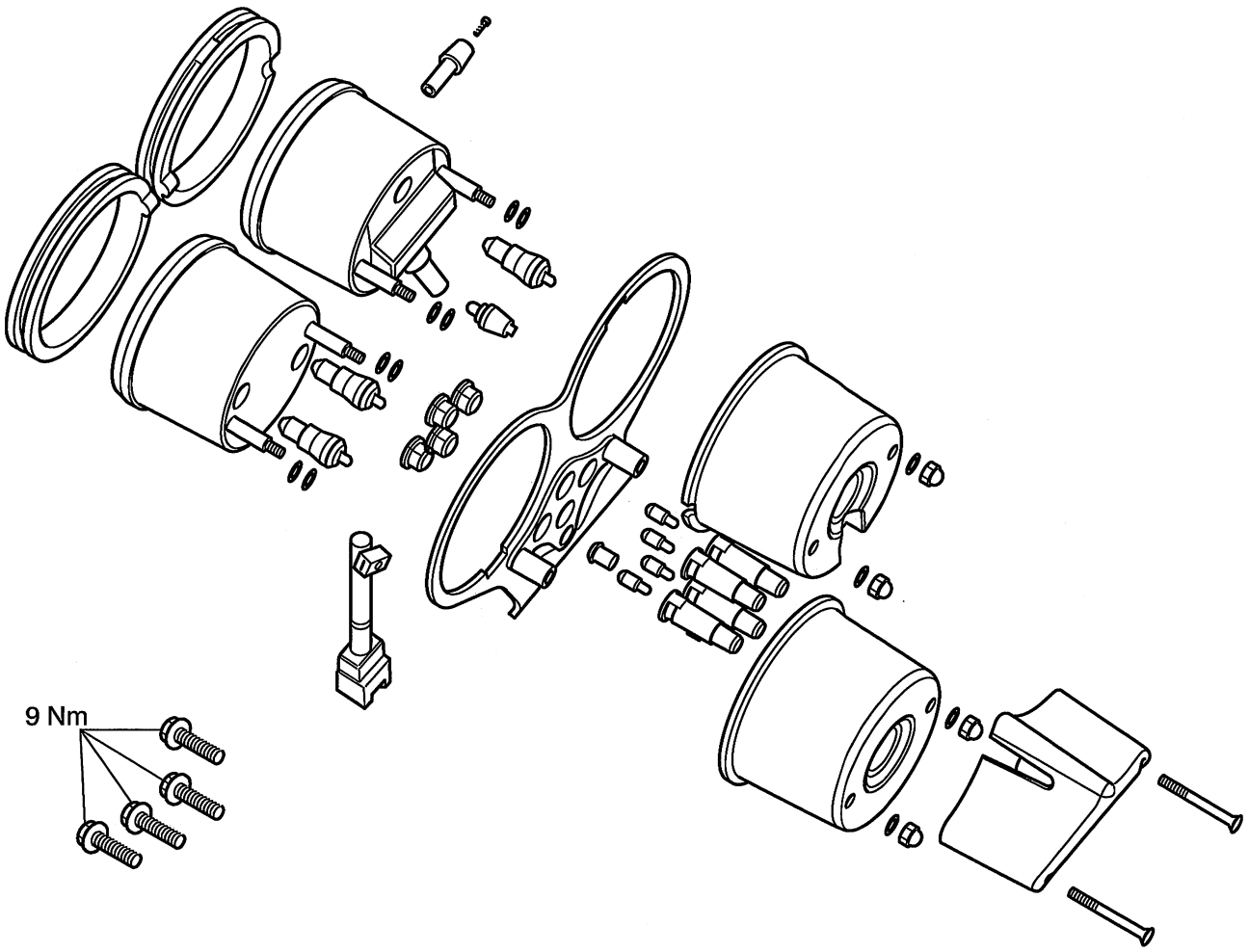
Exploded View

Speedometer Assembly - Bonneville



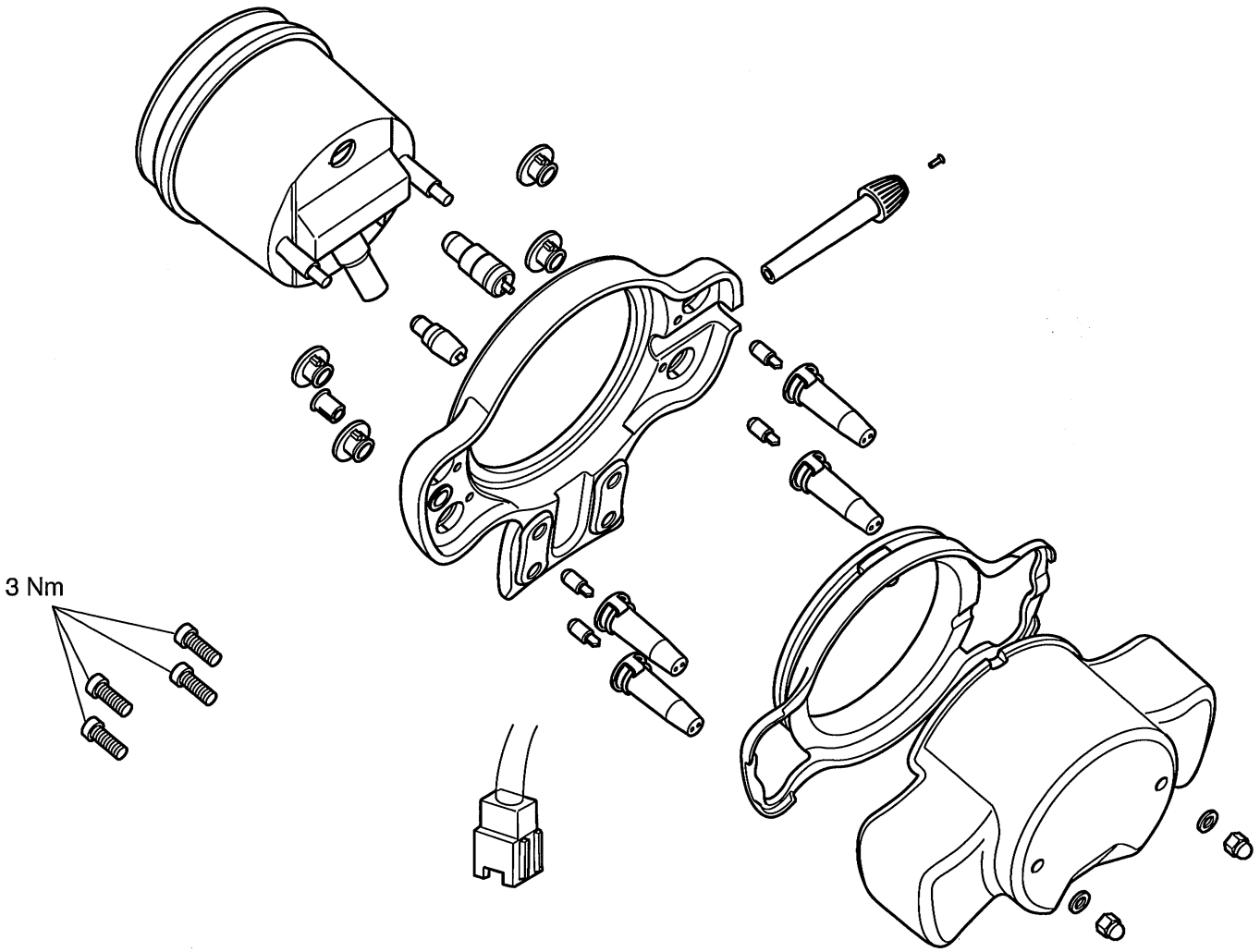
Exploded View

Speedometer Assembly - Bonneville T100 & Thruxton



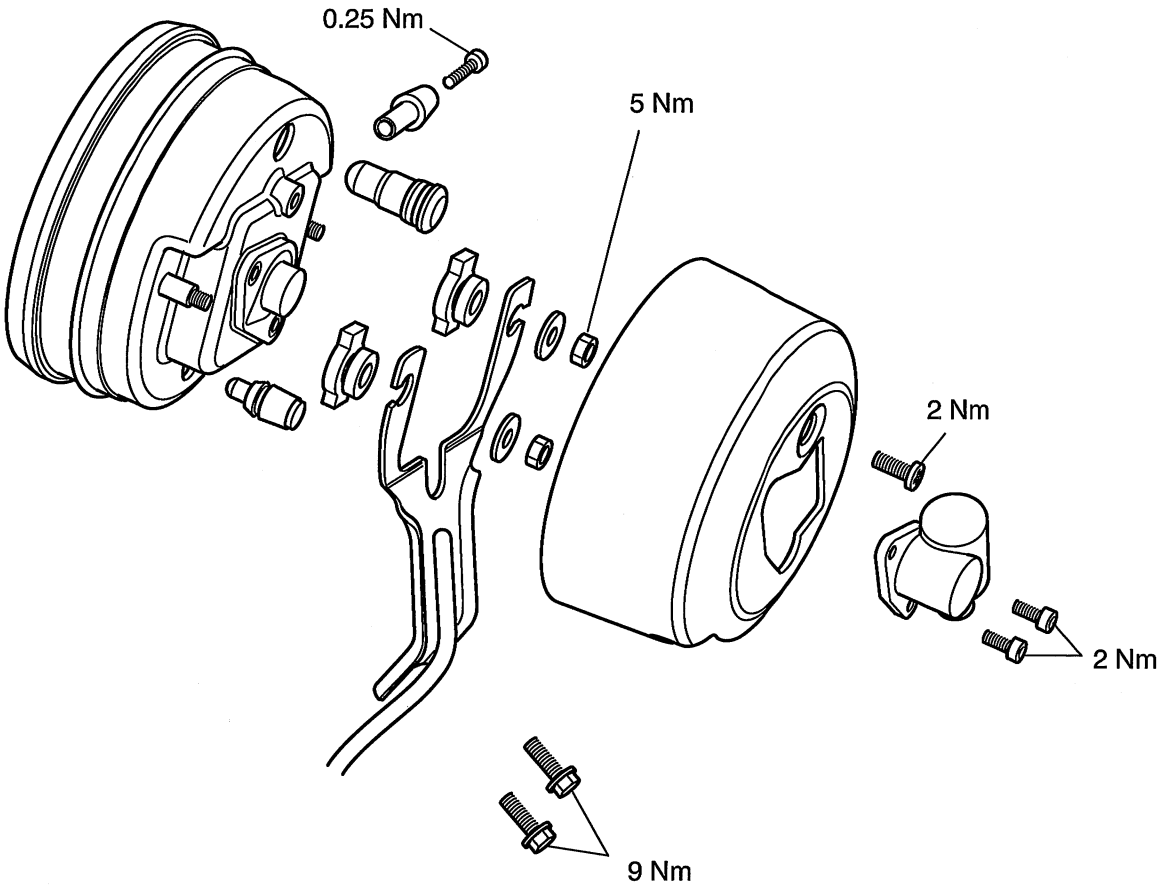
Exploded View

Speedometer Assembly - Scrambler



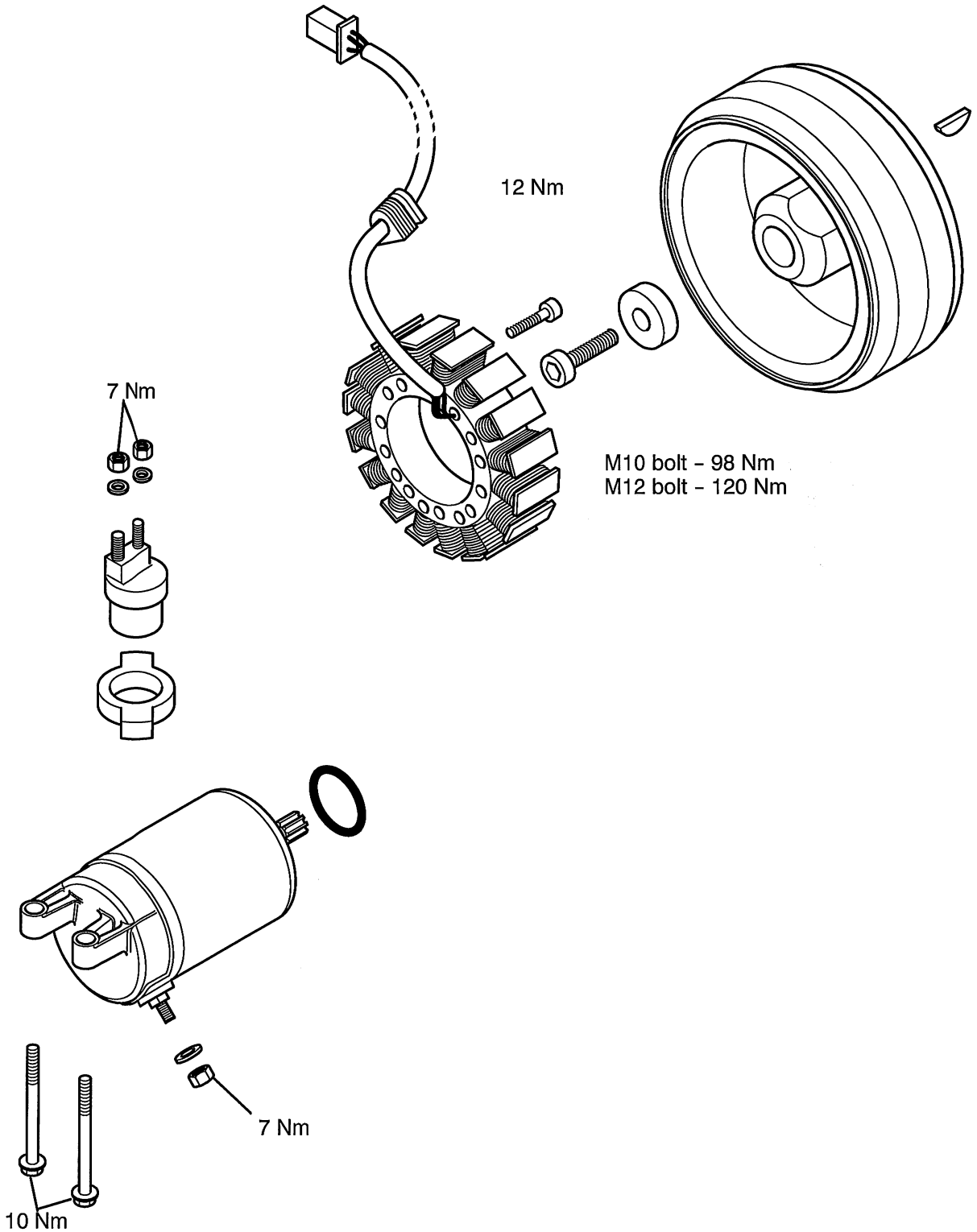
Exploded View

Speedometer Assembly - America & Speedmaster



Exploded View

Alternator and Starter - all models



ELECTRICAL AND IGNITION SYSTEM SAFETY PRECAUTIONS

WARNING: FAILURE TO OBSERVE ANY OF THE FOLLOWING WARNINGS COULD RESULT IN DAMAGE AND/OR PERSONAL INJURY.

WARNING: Always disconnect the battery when carrying out any work on the electrical system, ensuring the negative (-) terminal is disconnected first. On completion of the work, reconnect the battery, connecting the positive (+) terminal first and the negative (-) terminal last. Ensure the insulating cover is correctly fitted over the positive (+) terminal before installing the seat.

WARNING: The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.

WARNING: The battery contains sulphuric acid (electrolyte) which is corrosive and poisonous. Always wear eye and skin protection when handling electrolyte as contact with skin or eyes will cause severe burns. If electrolyte gets on your skin or in your eyes, flush with water immediately and seek urgent medical attention. If electrolyte is swallowed, drink large quantities of water and seek urgent medical attention. KEEP ELECTROLYTE OUT OF REACH OF CHILDREN.

WARNING: The voltages produced by the ignition system are extremely high. Do not touch any part of the ignition system whilst the engine is running.

WARNING: Wearers of surgically implanted heart pacemaker devices should not be in close proximity to ignition circuits or diagnostic equipment whilst the engine is running. The voltages present may interrupt the normal operation of such devices causing illness or death.

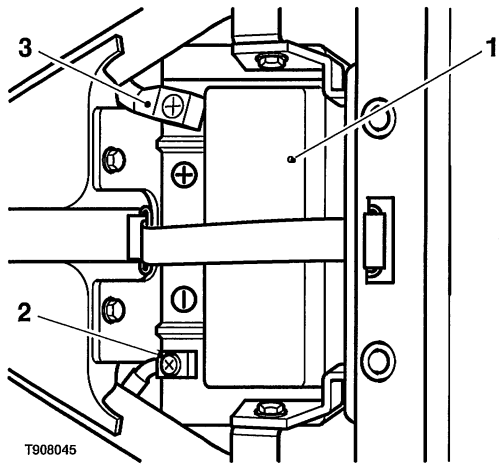
BATTERY

NOTE:

- **Read through the safety precautions before proceeding.**

Removal - Bonneville, Bonneville T100, Scrambler & Thruxton

1. Remove the seat.
2. Disconnect the battery, disconnecting the negative (-) terminal first.



1. Battery

2. Negative (-) terminal

3. Positive (+) terminal

3. Note the correct fitted location of the battery strap then unhook it from the frame.
4. Lift the battery out of position.

WARNING: Ensure that the battery terminals do not touch the motorcycle frame as the battery is removed.

Installation

WARNING: Ensure that the battery terminals do not touch the motorcycle frame as the battery is refitted.

1. Refit the battery and secure it in position with the strap, ensuring it is fitted as was noted prior to removal.
2. Reconnect the battery, connecting the positive (+) terminal first.
3. Apply a light coat of petroleum jelly to the battery terminals then seat the insulating cover over the positive (+) terminal.
4. Refit the seat.

Maintenance

1. The battery is a sealed type and does not require any maintenance other than routine recharging during storage. It is not possible to adjust the electrolyte level in the battery.

NOTE:

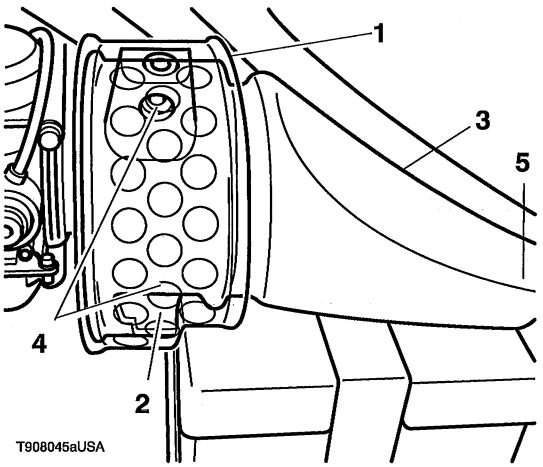
- **Read through the safety precautions before proceeding.**

Removal - America & Speedmaster

1. Release the screw securing the airbox finisher to the airbox cover. Remove the finisher.

2. Release the screws securing the airbox cover to the airbox.

3. Ease the cover outwards from the motorcycle releasing a stud, located at the rear of the cover, from its grommet.



1. Airbox finisher

2. Airbox finisher fixing location

3. Airbox cover

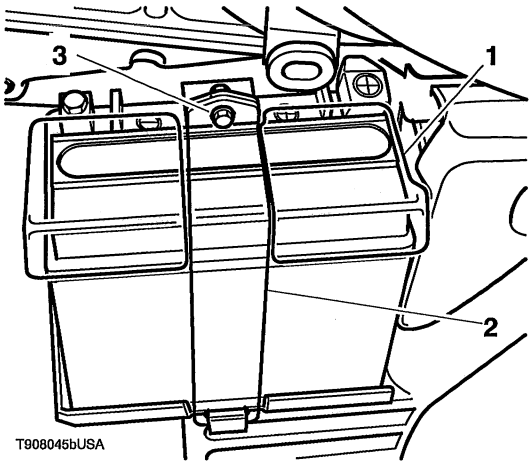
4. Airbox cover fixing locations

5. Stud location

4. Remove the fixing from the battery cover strap.

5. Detach the strap from its lower hinge and remove the battery cover.

6. Disconnect the battery leads, negative (black) lead first.



1. Battery cover

2. Battery cover strap.

3. Battery cover-strap fixing

7. Tilt the battery outward from the top to remove it from the battery tray.

WARNING: Ensure that the battery terminals do not touch any part of the motorcycle as this may cause a short circuit or spark which would ignite battery gases causing a risk of personal injury and damage to the motorcycle.

Installation - America & Speedmaster

1. Place the battery onto the battery tray taking care not to touch the terminals to the motorcycle.

2. Reconnect the battery leads, positive (red) lead first.

3. Apply a light coat of petroleum jelly to the terminals to prevent corrosion.

4. Cover the positive terminal with the protective cap.

5. Fit the battery cover and assemble the battery strap. Tighten the battery strap fixing to **9 Nm.**

6. Assemble the airbox cover and finisher, tightening all fixings to **3 Nm.** Ensure the airbox cover stud is correctly located.

Maintenance

1. The battery is a sealed type and does not require any maintenance other than routine recharging during storage. It is not possible to adjust the electrolyte level in the battery.

BATTERY CHARGING

NOTE:

- **Read through the safety precautions before proceeding.**

New Battery

To ensure that a new battery is correctly commissioned and will deliver maximum capacity for starting, the following procedure must be followed.

1. Read the instructions and warnings delivered with the battery.
2. Place the battery on a flat level surface, remove and discard the sealing foil.
3. Remove the battery sealing strip from the electrolyte container (if applicable) and save for later in this procedure. Do not break the seal on the electrolyte container.
4. Place the electrolyte and adapter (if applicable) on the battery and fill the battery according to the manufacturers instructions.
5. After starting to fill the battery with electrolyte, allow the battery to stand for 30 minutes with the filling container in place.
6. Check that all of the electrolyte has drained from the container, do not remove the container at this point. If the container has not completely drained, tap the sides of the container to start the electrolyte flowing again.
7. After the electolyte has drained into the battery, allow the battery to stand with the electrolyte container in place, for a further 30 minutes.
8. Remove the electrolyte container and adapter carefully, and dispose of immediately.
9. Fit the sealing caps to the battery according to the manufacturers instructions. Measure the terminal voltage on the battery to assess the battery condition and charge the battery as necessary using a suitable charger (i.e. a charger with a suitably controlled charging current and appropriate cut off voltage). Charging current should be controlled to1.2 Amps.

Table of charging times

Terminal Voltage	Charge Time	Cut-off Voltage
>12.8 V	2 hours	14.5 V
>12.7 V	3 hours	14.5 V
>12.6 V	4 hours	14.5 V
>12.5 V	6 hours	14.5 V
Less than 12.5 V	8 - 10 hours	14.5 V

10. Disconnect the charger and allow the battery to stand for 1 hour before fitting to the motorcycle.

Battery Already in Service

When re-charging a battery in service, the following precautions must be taken to avoid damage to the battery.

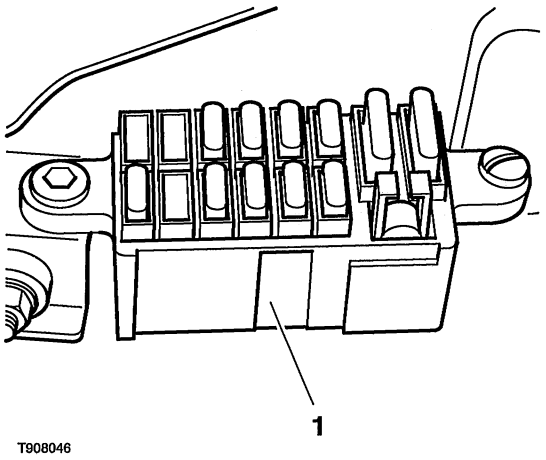
1. The charging rate must not exceed 1.2 A except for a boost charge where a maximum charge rate of 4 Amps. (for no longer than 1 hour) is allowed.

CAUTION: Boost charge should only be performed if the battery is in a severely discharged state. Boost charging a part discharged battery will damage the cells and plates leading to permanent battery damage.

FUSES AND RELAYS

Fuse Location - Bonneville, Bonneville T100, Scrambler & Thruxton

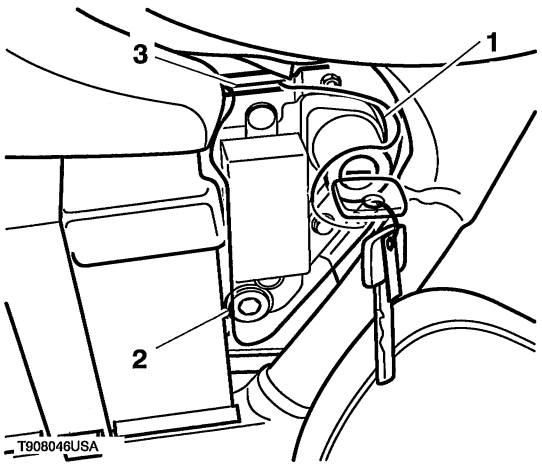
Fuses are located in the fuse box located behind the right side cover.



1. Fuse box

Fuse Location - America & Speedmaster

The fuse box is located beneath the ignition switch cover. To remove the ignition switch cover and access the America and Speedmaster fuses, ease the ignition switch cover outwards from the bottom. Once free of its retaining grommet, hinge the cover upwards and detach from the slot in the bracket.



1. Ignition Switch Cover

2. Retaining Grommet

3. Bracket Slot

Fuses - All models

If a fuse fails, inspect the electrical system to determine the cause, and then replace it with a new fuse of correct current rating.

WARNING: Always replace blown fuses with new ones of the correct current rating (as specified on the fuse box cover) and never use a fuse of higher rating.

A blown fuse is indicated when all of the systems protected by that fuse circuit become inoperative. When checking for a blown fuse, use the tables below to establish which fuse has blown.

NOTE:

- **The fuse identification numbers listed in the following tables correspond with those printed on the fuse box cover.**
- **Spare fuses of all ratings should be carried on the motorcycle for use in case of emergency. Always replace a spare fuse if it is used.**

Fuse identification - America & Speedmaster

Fuse No	Circuits Protected	Fuse Rating (Amp.)
1	Accessory lights	10
2	Ignition switch main feed	30
3	Accessory socket	10
4	Alarm	10
5	Instruments, igniter unit, starter relay	15
6	Not used	-
7	Indicators, brake light, horn	10
8	Position light, instrument illumination	5
9	Headlight dip/main beam	10
10	Position lights	5
11	Main fuse	30

Fuse identification - Bonneville, Scrambler & Bonneville T100

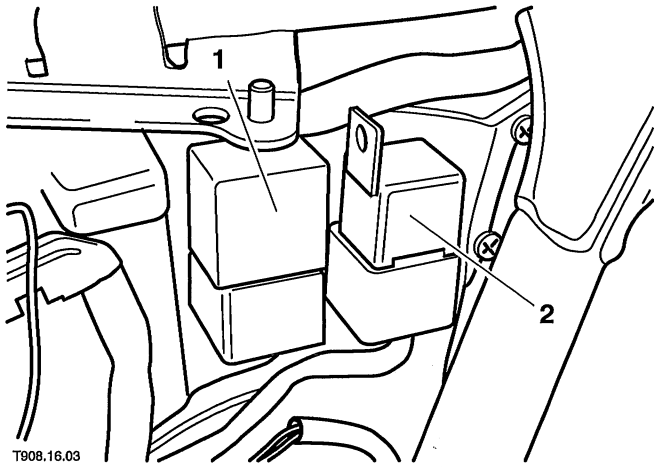
Fuse No	Circuits Protected	Fuse Rating (Amp.)
1	Not used	-
2	Ignition switch main feed	30
3	Accessory socket	10
4	Alarm	5
5	Instruments, igniter unit, starter relay	15
6	Not used	-
7	Indicators, brake light, horn	10
8	Position light, instrument illumination	5
9	Headlight dip/main beam	10
10	Position lights	5
11	Main fuse	30

Fuse identification - Thruxton

Fuse No	Circuits Protected	Fuse Rating (Amp.)
1	Not used	-
2	Ignition switch main feed	30
3	Accessory socket	10
4	Alarm	5
5	Instruments, igniter unit, starter relay	15
6	Not used	-
7	Indicators, brake light, horn	10
8	Instrument illumination	5
9	Headlight dip/main beam	10
10	Position lights	5
11	Main fuse	30

Relays - Bonneville, Bonneville T100, Scrambler & Thruxton

The headlight and indicator relays are located behind the left side cover.

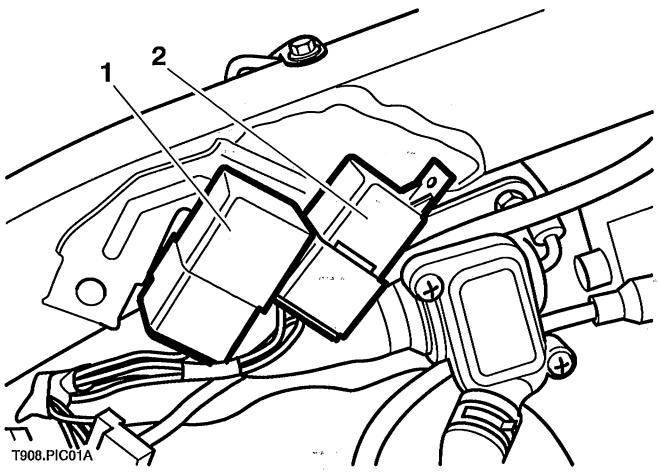


1. Indicator relay

2. Headlight relay

Relays - America & Speedmaster

The headlight and indicator relays are located beneath the fuel tank on the right hand side of the frame spine tube.



1. Indicator relay

2. Headlight relay

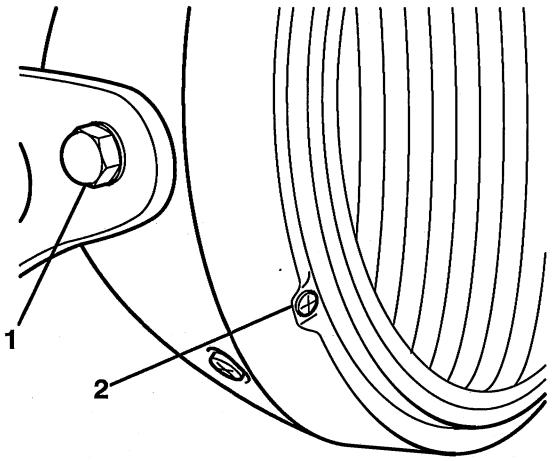
HEADLIGHT BEAM ADJUSTMENT

WARNING: Never attempt to adjust the headlight beam when the motorcycle is in motion. Any attempt to adjust the headlight beam when the motorcycle is in motion may result in loss of control and an accident.

WARNING: Adjust road speed to suit the visibility and weather conditions in which the motorcycle is being operated. Ensure that the beam is adjusted to illuminate the road surface sufficiently far ahead, but without dazzling oncoming traffic. An incorrectly adjusted headlight may impair visibility causing loss of motorcycle control and an accident.

Bonneville, Bonneville T100, Scrambler & Thruxton

1. Switch the headlight dipped beam on.
2. Vertical adjustment of the headlight beam is made by slackening its mounting bolts and repositioning the light unit on its mounting brackets. Once the beam is correctly set retighten the mounting bolts to **10 Nm**.



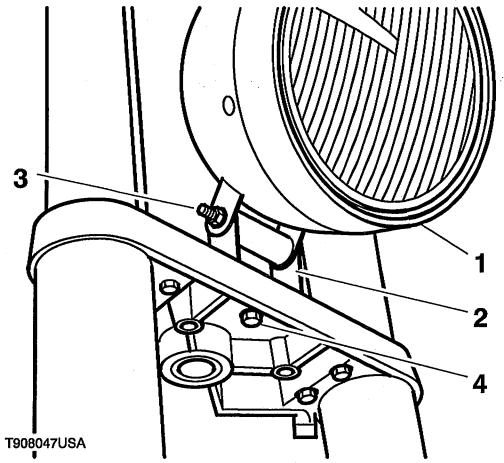
1. Headlight mounting bolt

2. Horizontal adjustment screw

3. Horizontal adjustment of the beam is made using the screw in the headlight rim. Rotate the adjustment screw clockwise to move the beam to the left and anti-clockwise to move it to the right.
4. Switch the headlight off when the beam is correctly set.

America & Speedmaster

1. Switch the headlight dipped beam on.
2. Horizontal adjustment of the headlight beam is controlled by the position of the bracket on which the headlight is mounted. To adjust the horizontal position of the headlight, slacken the bracket retaining bolt and turn the headlight assembly left or right. When set to the correct position, tighten the bracket fixing to **27 Nm.**
3. Vertical adjustment of the headlight is controlled by the position of the headlight bowl in relation to the bracket on which it is mounted. To adjust the vertical setting, slacken the headlight bowl pinch-bolt and move the headlight assembly up or down. When set to the correct position, tighten the bracket pinch-bolt to **27 Nm.**



1. Headlight

2. Headlight bracket

3. Pinch-bolt (vertical setting)

4. Bracket fixing (horizontal setting)

4. Switch the headlight off when the beam is correctly set.

HEADLIGHT BULB REPLACEMENT

All models

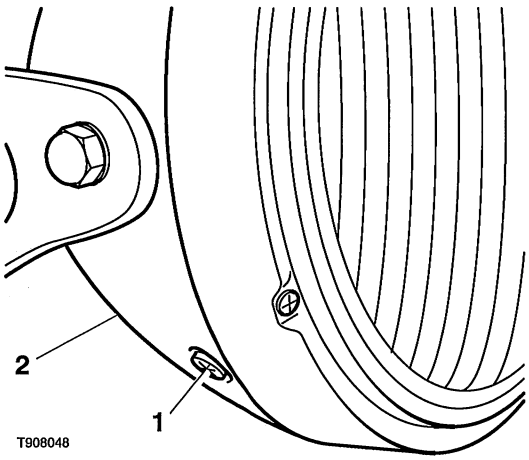
NOTE:

- **Read through the safety precautions before proceeding.**

> **WARNING: Bulbs become hot during use. Always allow sufficient time for the bulb to cool before handling.**

Headlight/sidelight

1. Undo the screws and free the headlight rim from the shell.



1. Headlight rim screw

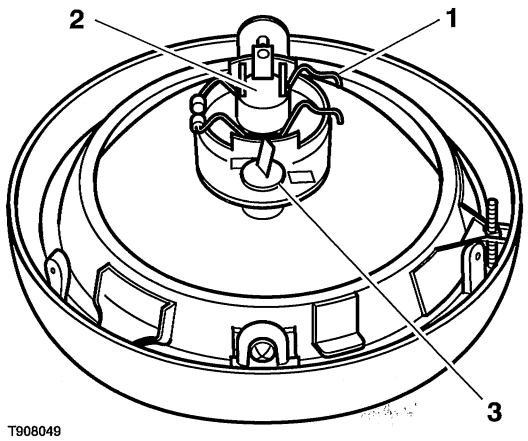
2. Headlight shell

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight rim.

3. Free the rubber cover from the rear of the reflector.

> **CAUTION: Avoid touching the headlight bulb glass. If the glass is touched or gets dirty, clean with alcohol before installation.**

4. To renew the headlight bulb, release the retaining clip and remove the bulb. Fit the new bulb, ensuring its tabs are correctly located in the reflector slots, and secure it in position with the retaining clip.



1. Headlight bulb retaining clip

2. Headlight bulb

3. Sidelight bulbholder

5. To renew the sidelight bulb, release the retaining clip and remove the sidelight bulbholder. Press the bulb in and turn it anti-clockwise to release it from the holder. Fit the new bulb to the holder then clip the holder securely into the reflector.

6. Securely fit the rubber cover to the rear of the reflector.

7. Reconnect the wiring connectors to the headlight and sidelight bulbs.

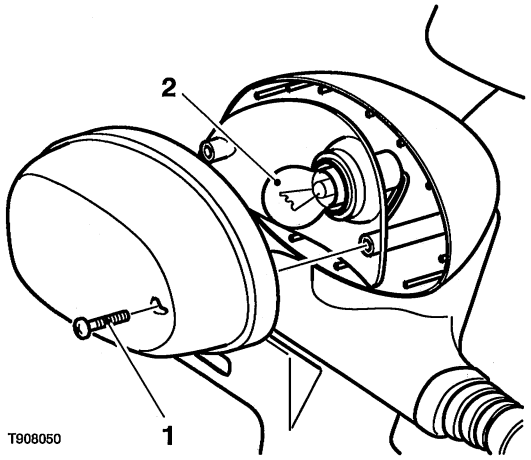
8. Seat the headlight rim correctly in its shell and securely tighten its screws.

9. Check the headlight beam alignment.

REAR LIGHT BULB REPLACEMENT

All models

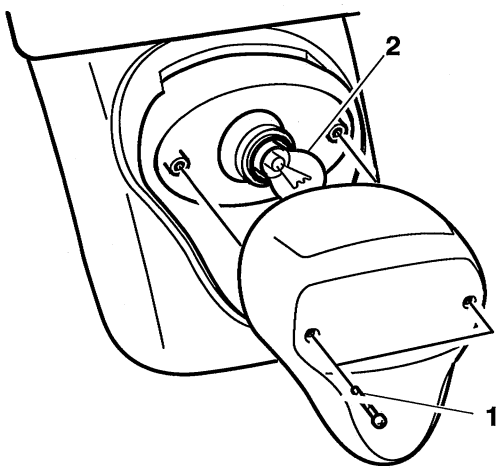
1. Undo the screws and remove the lens from the light unit.



Bonneville, Bonneville T100, Scrambler & Thruxton

1. Lens screw

2. Bulb



America & Speedmaster

1. Lens screw

2. Bulb

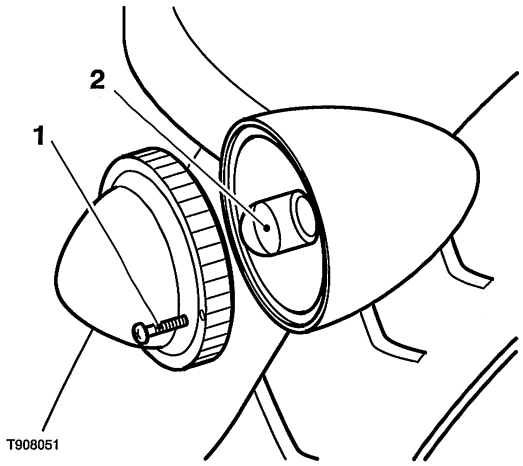
2. Push the bulb in and rotate it anti-clockwise to free it from its holder.

3. Fit the new bulb (the bulb pins are offset) securely to the holder then refit the lens.

INDICATOR BULB REPLACEMENT

All models

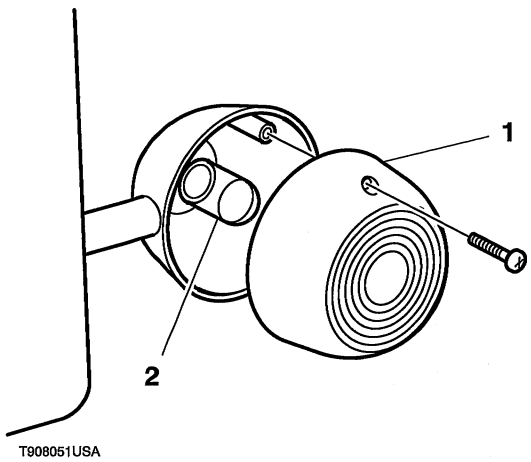
1. Undo the screws and remove the lens from the light unit.



Bonneville, Bonneville T100, Scrambler & Thruxton

1. Lens screw

2. Bulb



America & Speedmaster

1. Lens screw

2. Bulb

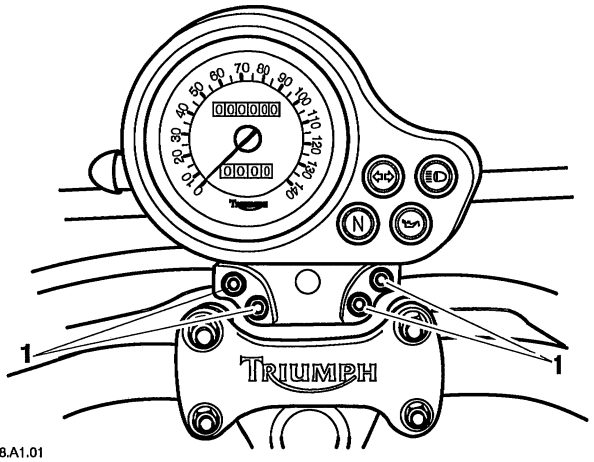
2. Push the bulb in and rotate it anti-clockwise to free it from its holder.

3. Fit the new bulb securely to the holder then refit the lens.

WARNING LIGHT BULB REPLACEMENT

Bonneville, Bonneville T100, Scrambler & Thruxton

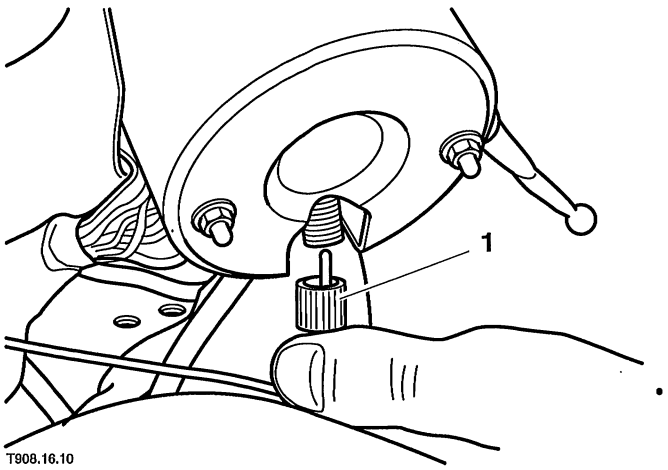
1. Unscrew the mounting bolts and free the speedometer housing from the top yoke.



T908.A1.01

1. Speedometer housing bolts (Bonneville shown)

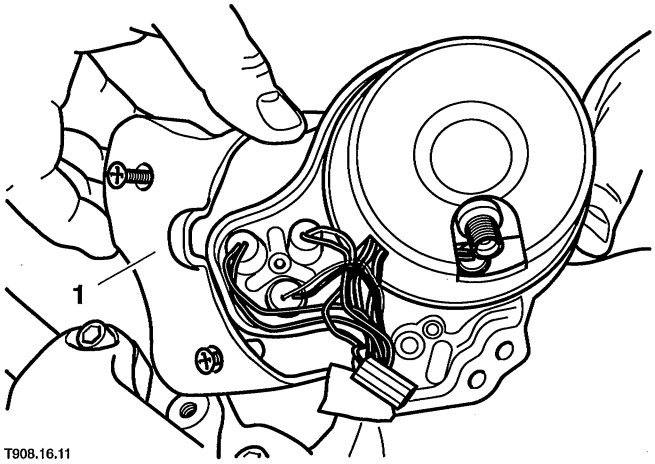
2. To improve access, unscrew the retaining ring and disconnect the speedometer cable



T908.16.10

1. Speedometer cable retaining ring

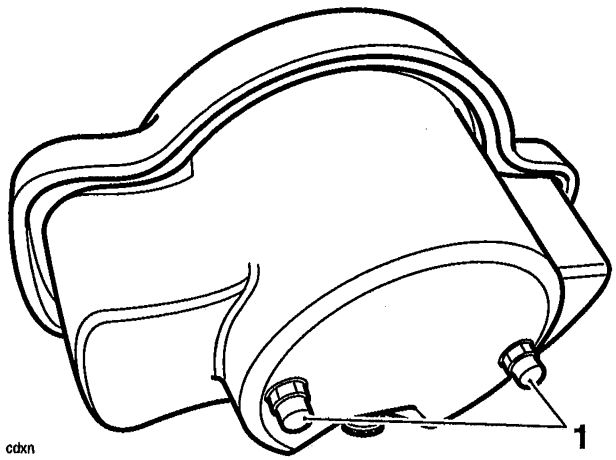
3. All except Scrambler - Undo the screws and remove the cover from the base of the housing to gain access to the bulbholders.



T908.16.11

1. Bulbholder cover (Bonneville shown)

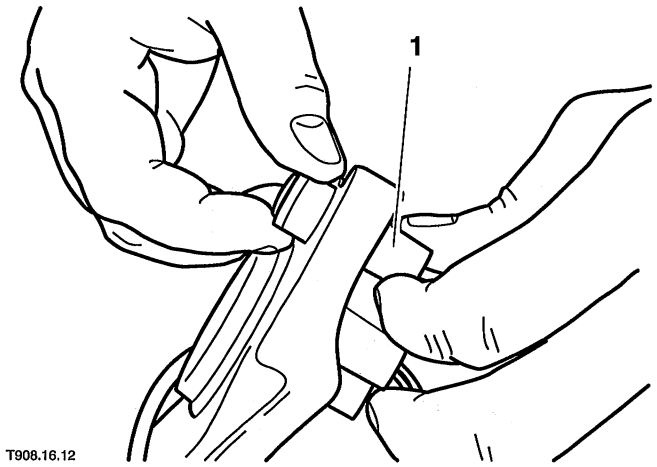
3. Scrambler only - Undo the two domed nuts and washers and remove the instrument cover to gain access to the bulbholders.



cdxn

1. Instrument cover nuts and washers (Scrambler)

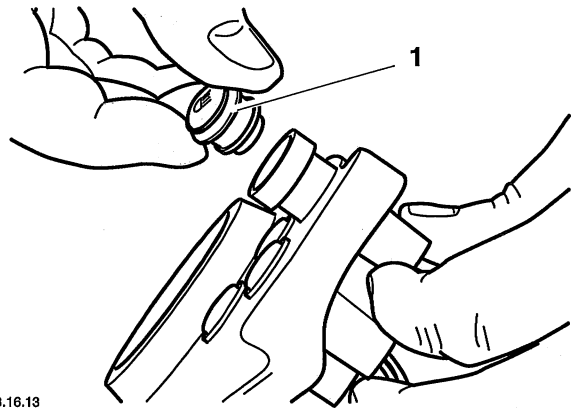
4. All models - Push the relevant bulbholder out from the housing.



T908.16.12

1. Bulbholder

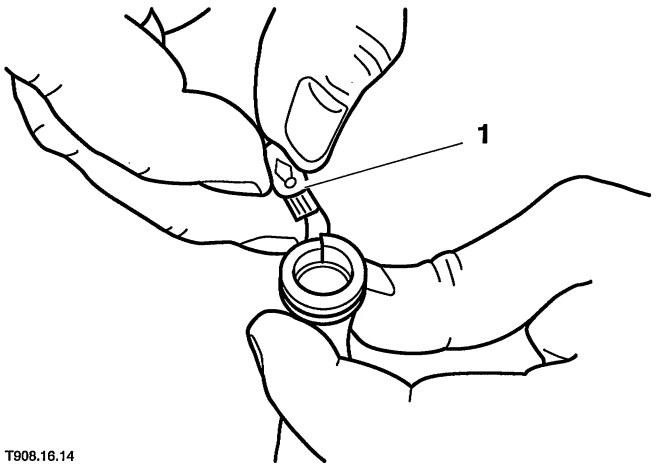
5. Remove the lens from the holder and pull out the bulb.



T908.16.13

1. Bulbholder lens

6. Fit the new bulb to the holder and refit the lens. Insert the holder into the housing ensuring it is correctly located.



T908.16.14

1. Bulb

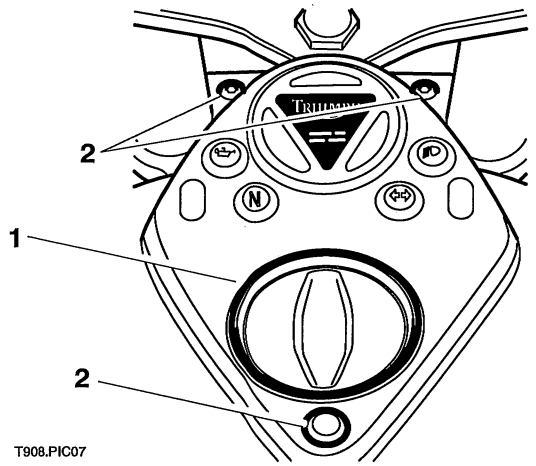
7. Check the operation of the bulb then refit the cover to the housing.

8. Reconnect the speedometer cable then seat the housing on the top yoke, tightening its mounting bolts to **9 Nm**.

WARNING LIGHT BULB REPLACEMENT

America & Speedmaster

1. Release the screws securing the warning light console to the fuel tank.

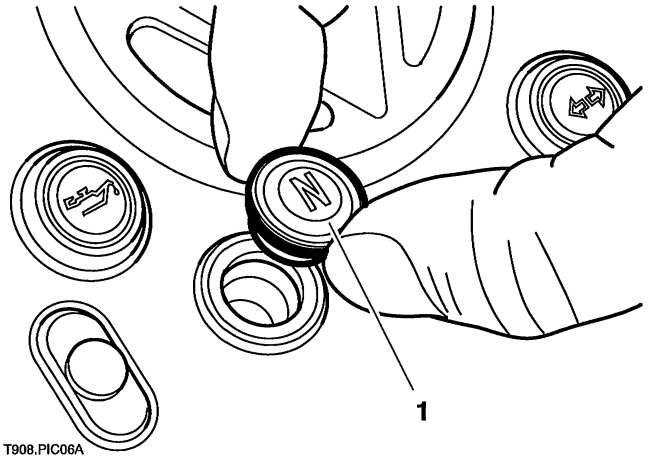


1. Console

2. Screws

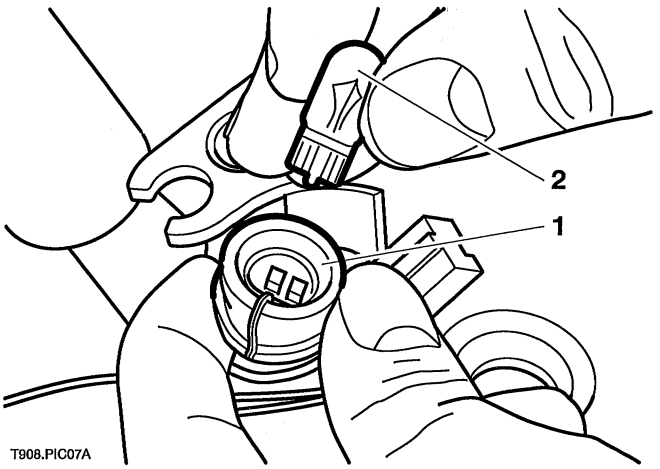
2. Raise the console and disconnect the multi-plug connector joining the warning light harness to the main harness.

3. Carefully prise the warning light lens (of the light to be rectified/checked) from the upper side of the console.



1. Warning light cover

4. Peel back the rubber cover surrounding the bulb and then remove the bulb from the holder.



1. Rubber cover

2. Bulb

NOTE:

- **The bulbs do NOT have bayonet retainers.**

5. Fit the replacement bulb.
6. Return the rubber cover to its normal condition.
7. Refit the warning light lens.
8. Position the console to the fuel tank and reconnect the wiring multi-plug connector.
9. Fit the console and tighten its screws to **5 Nm.**
10. Check for correct operation of the lights.

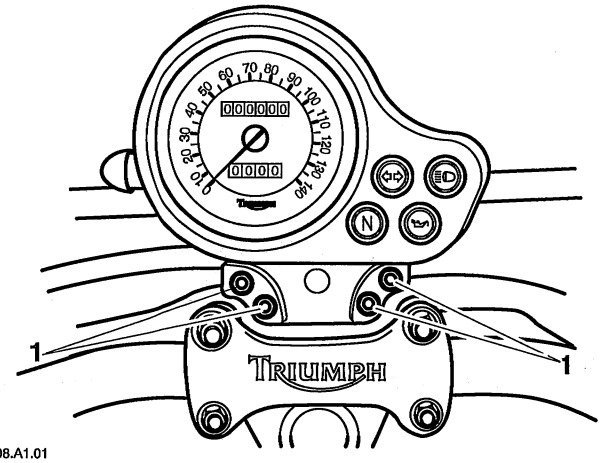
SPEEDOMETER LIGHT BULB REPLACEMENT

Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

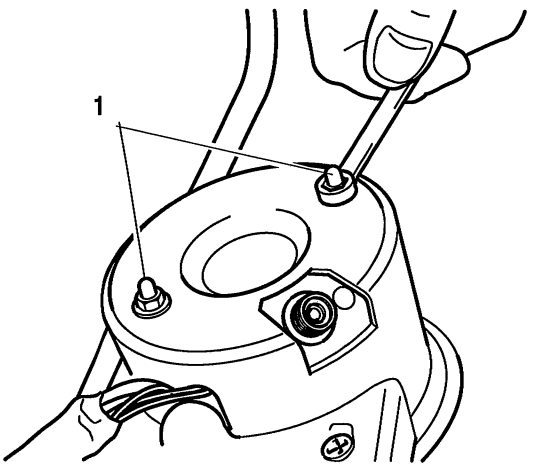
1. Unscrew the mounting bolts and free the speedometer housing from the top yoke.



T908.A1.01

1. Speedometer housing bolts (Bonneville)

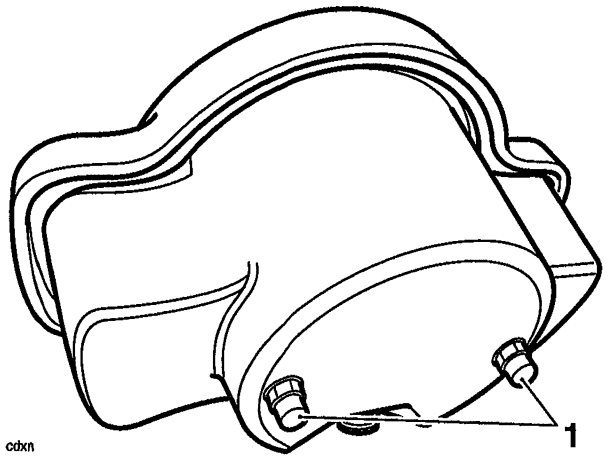
2. Unscrew the retaining ring and detach the cable from the speedometer.
3. All except Scrambler - Unscrew the nuts and washers and remove the cover from the base of the speedometer.



T908.16.16

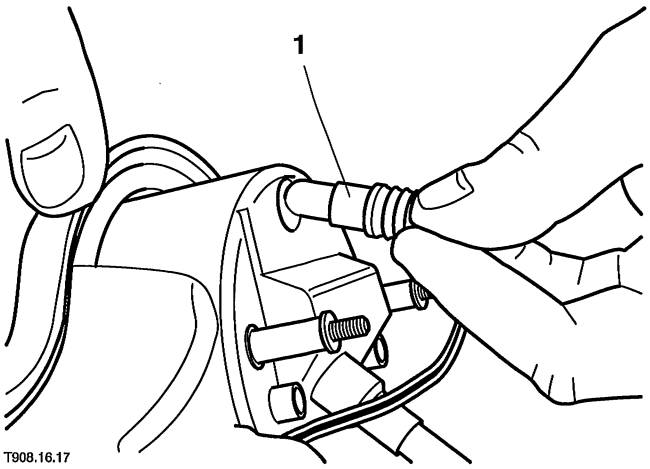
1. Speedometer cover nuts

3. Scrambler only - Undo the two domed nuts and washers and remove the instrument cover to gain access to the bulbholders.



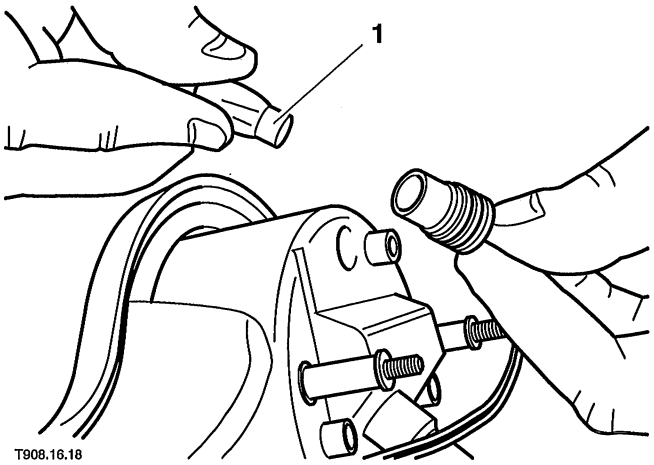
1. Instrument cover nuts and washers (Scrambler)

4. All models - free the relevant bulbholder from the speedometer and remove the bulb.



1. Bulbholder

5. Fit the new bulb to the holder and insert the holder into the speedometer.



1. Bulb

6. Refit the cover to the speedometer.

7. Seat the speedometer housing on the top yoke, tightening its mounting bolts to **9 Nm.**

8. Reconnect the speedometer cable.

SPEEDOMETER LIGHT BULB REPLACEMENT

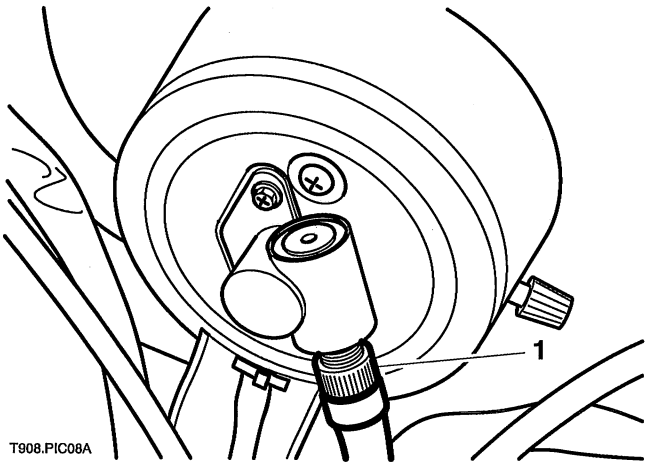
America & Speedmaster

NOTE:

- **Read through the safety precautions before proceeding.**

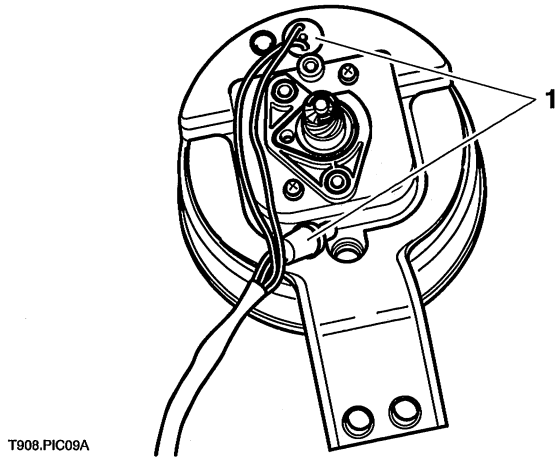
Removal

1. Unscrew the mounting bolts and free the speedometer housing from the top yoke.
2. Unscrew the retaining ring and detach the cable from the speedometer.



1. Speedometer cable retaining ring

3. Remove the angle drive from the base of the speedometer.
4. Unscrew the fixings and remove the cover from the base of the speedometer.
5. Free the relevant bulbholders from the speedometer.



1. Bulb holders

Installation

1. Fit the bulbholders then seat the cover on the speedometer. Refit the fixings and tighten to **2 Nm.**
2. Refit the angle drive.
3. Seat the speedometer housing on the top yoke, tightening its mounting bolts to **9 Nm.**
4. Check for correct operation. Rectify any faults as necessary.

HEADLIGHT

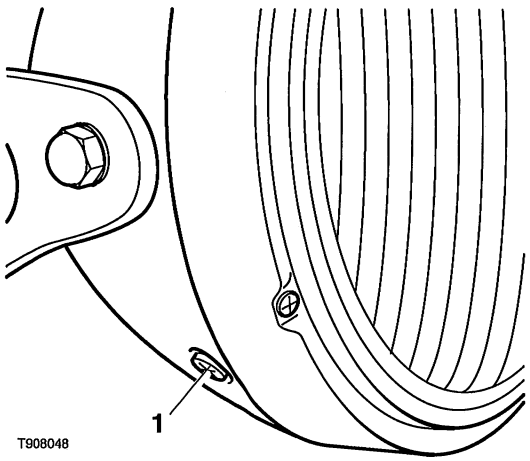
All Models

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Undo the screws and free the headlight rim from the shell.



1. Headlight rim screw

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.
3. Unscrew the mounting bolts and washers and recover the mounting rubber and plate positioned between the headlight shell and each bracket.
4. Free the headlight shell from the wiring and remove it from the motorcycle.
5. If necessary, the headlight mounting brackets and rubbers can be removed once the forks have been removed.

Installation

1. Ensure the rubber grommet is correctly fitted to the headlight shell then feed all the wiring into the rear of the shell.
2. Ensure the mounting plate and rubber is correctly positioned between the headlight shell and each mounting bracket then fit the bolts and washers. Tighten the mounting bolts lightly only at this stage.
3. Reconnect the wiring connectors to the headlight and sidelight bulbs.
4. Seat the headlight rim correctly in its shell and securely tighten its screws.
5. Adjust the headlight beam alignment then tighten the mounting bolts to **10 Nm.**

REAR LIGHT

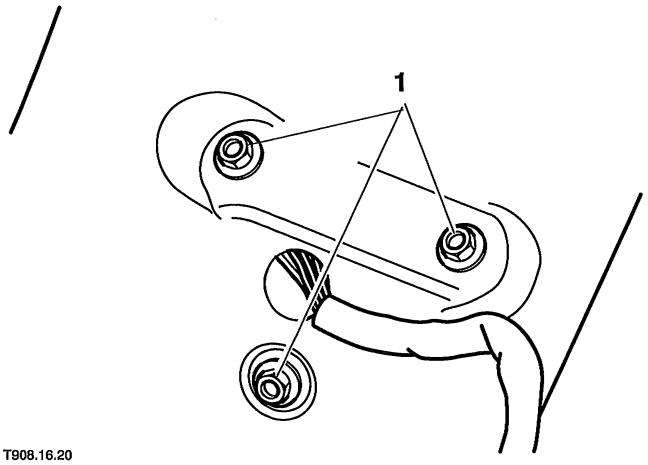
Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

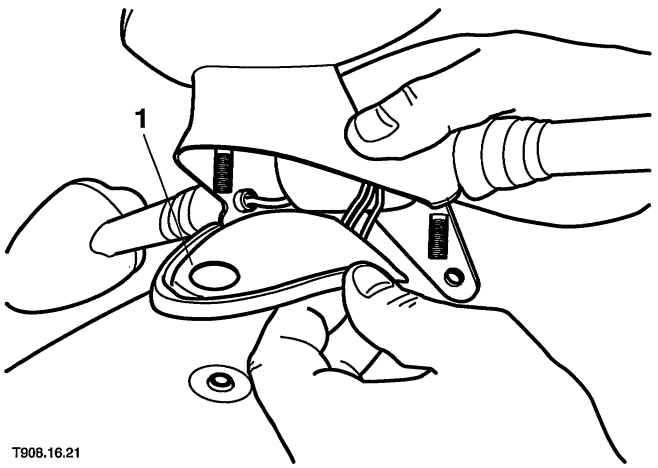
1. Remove the rear mudguard.
2. Free the rear light wiring from the mudguard.
3. Unscrew the nuts and recover the collars from the rear light unit mounting rubbers.



T908.16.20

1. Rear light nuts

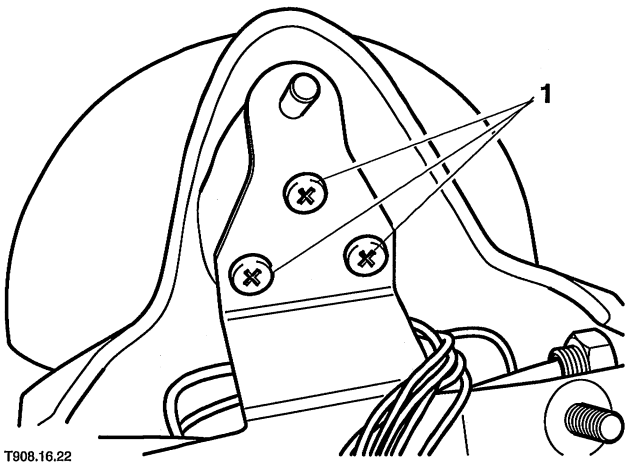
4. Remove the light unit from the mudguard and recover its rubber seal. On Scrambler remove the light unit spacer.



T908.16.21

1. Rubber seal

5. Undo the three screws and free the rear light unit from the mounting bracket. Disconnect the indicator wiring connectors from the rear light wiring harness and remove the light unit.

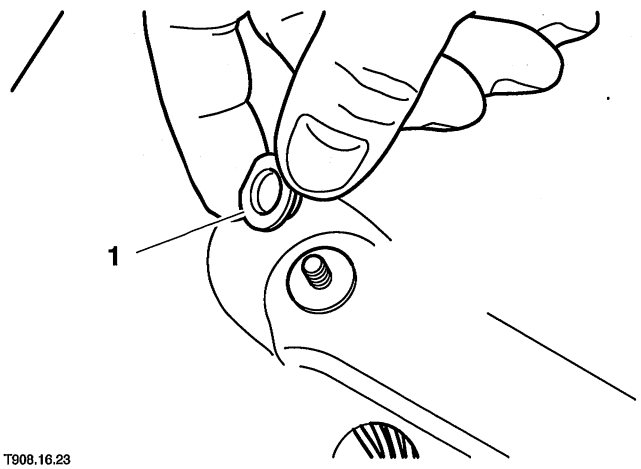


T908.16.22

1. Rear light screws

Installation

1. Where necessary, reconnect the indicator light wiring connectors to the rear light wiring harness. Locate the light unit on the bracket and securely tighten its retaining screws.
2. Ensure the three mounting rubbers are correctly fitted to the rear mudguard and fit the rubber seal to the mounting bracket. On Scrambler fit the light unit spacer.
3. Fit the rear light assembly to the mudguard. Fit the collars to the mounting rubbers and tighten the mounting nuts to **9 Nm.**



T908.16.23

1. Collar

4. Clip the wiring harness onto the underside of the mudguard then refit the rear mudguard.

REAR LIGHT

America & Speedmaster

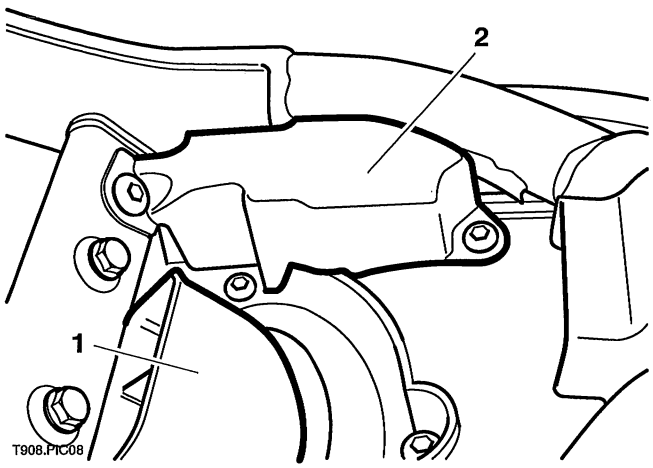
NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove rear and front seats as described in the body section.

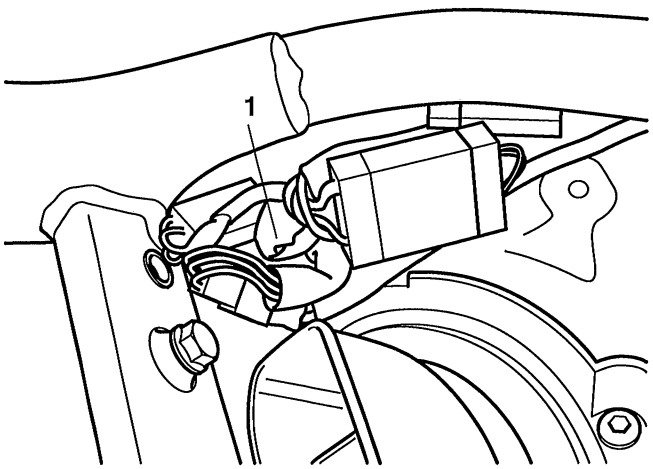
2. Remove the connector cover from the top of the airbox.



1. Airbox

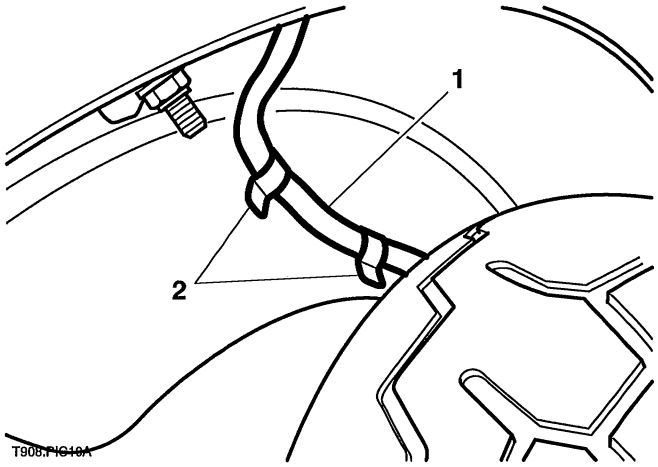
2. Cover

3. Trace through and disconnect the rear light connector.



1. Rear light connector location

4. Release the wiring from its clips beneath the mudguard.



1. Wiring

2. Clips

5. Release the nuts securing the light to the rear mudguard.

6. Remove the light collecting the flanged sleeves from the mounting points.

Installation

1. Ensure the three mounting rubbers are correctly fitted to the rear mudguard.

2. Fit the rear light assembly to the mudguard. Fit the collars to the mounting rubbers and tighten the mounting nuts to **5 Nm.**

3. Securely clip the wiring harness onto the underside of the mudguard.

4. Reconnect the light to the main harness then refit the cover to the top of the airbox.

5. Refit the seats and test the lamp for correct operation. Rectify any faults if necessary.

FRONT INDICATOR

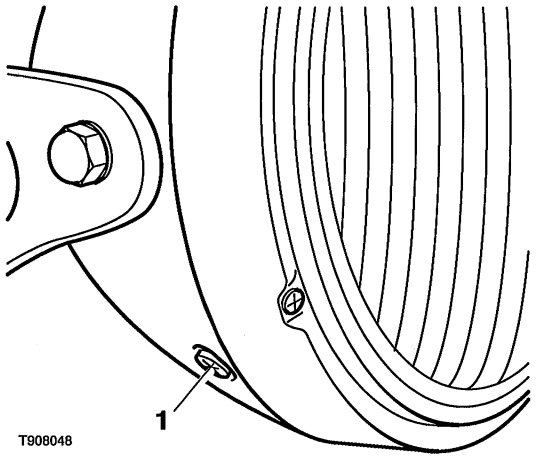
Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Undo the screws and free the headlight rim from the shell.



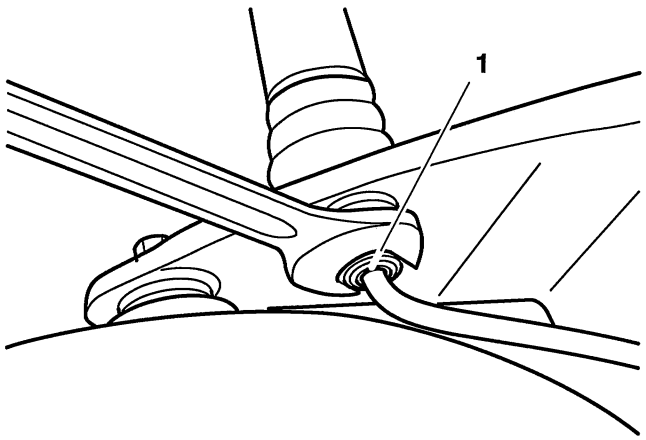
1. Headlight rim screw

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.

3. Locate the indicator wiring connectors inside the headlight shell and disconnect them from the main harness.

4. Thruxton and Scrambler only, slide back the rubber boot covering the indicator fixings.

5. Slacken and remove the mounting nut, and washers then remove the indicator from its mounting position.



1. Indicator nut (Bonneville)

Installation

1. Install the indicator and fit the washers and mounting nut, tightening it to **18 Nm.**

2. On Thruxton and Scrambler, cover the mounting nut with the rubber boot.

3. Route the wiring into the headlight shell and reconnect it to the main wiring harness.

4. Reconnect the wiring connectors to the headlight and sidelight bulbs.

5. Seat the headlight rim correctly in its shell and securely tighten its screws.

FRONT INDICATOR

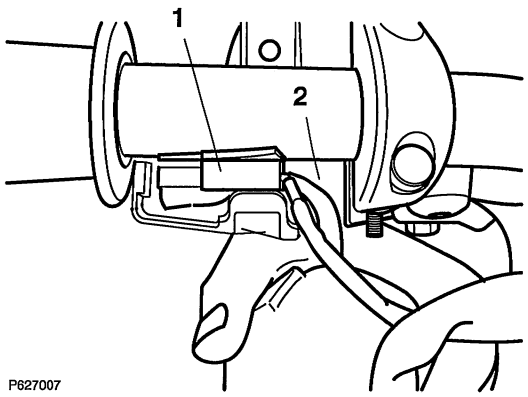
America & Speedmaster

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the rear half of the switchgear nearest to the lamp being removed.
2. Free the indicator wiring from the recess in the rear of the front half of the switchgear.

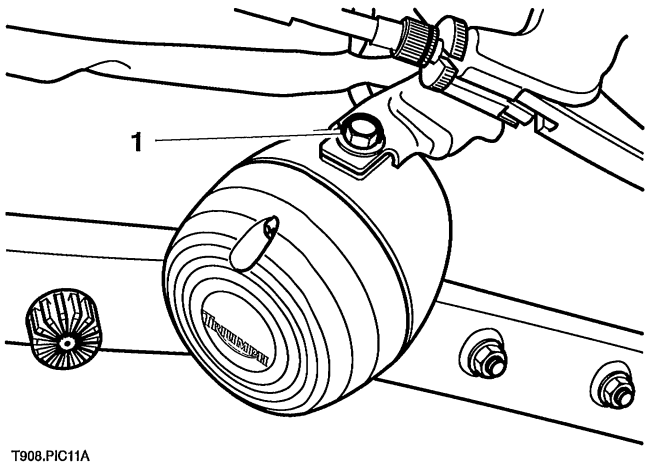


P627007

1. Cable connector

2. Recess

3. Disconnect the indicator wiring connection.
4. Release the indicator fixing and remove the indicator.



T908.PIC11A

1. Indicator fixing

Installation

1. Position the indicator to the bracket, insert the fixing and tighten to **9 Nm.**
2. Reconnect the wiring.
3. Tuck the indictor wiring connector into the recess in the front half of the switchgear.
4. Refit the switchgear and secure with its screws.
5. Check the operation of the switch and indicator. Rectify any faults as necessary.

REAR INDICATOR

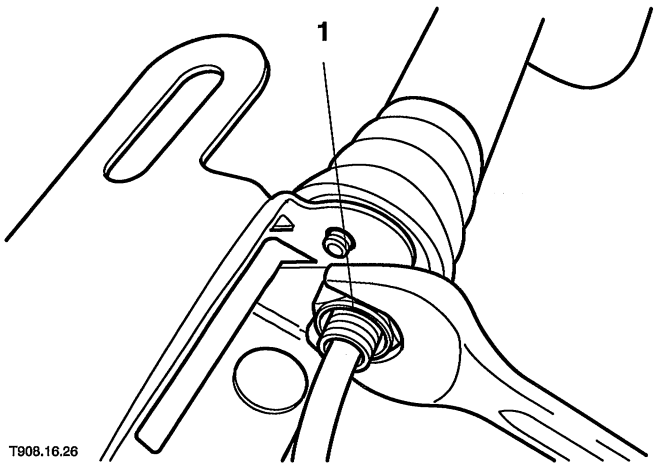
Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the rear light unit and separate it from the mounting bracket.
2. Slacken and remove the mounting nut, and washers then remove the indicator from the mounting bracket.



1. Indicator nut

3. Disconnect the indicator wiring.

Installation

1. Install the indicator and fit the washers and mounting nut, tightening it to **18 Nm**.
2. Refit the rear light unit.
3. Test the indicator. Rectify any faults as necessary.

REAR INDICATOR

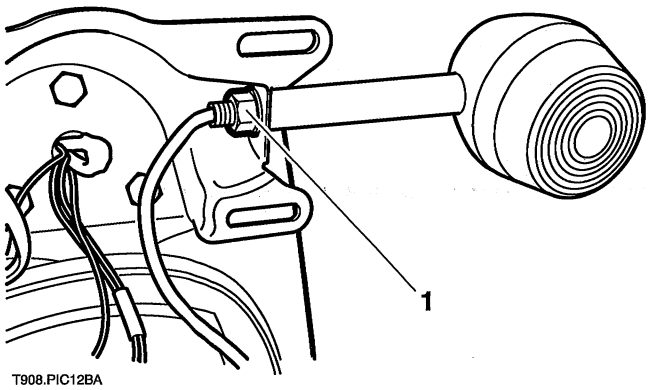
America & Speedmaster

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the registration plate.
2. Slacken and remove the mounting nut, and washers then remove the indicator from the mounting bracket.



1. Indicator nut

3. Disconnect the indicator wiring.

Installation

1. Install the indicator, reconnect the wiring and fit the washers (serrated washer nearest the bracket, flat washer under the nut) and mounting nut, tightening it to **18 Nm**.
2. Refit the registration plate.
3. Test the indicator. Rectify any faults as necessary.

SPEEDOMETER ASSEMBLY

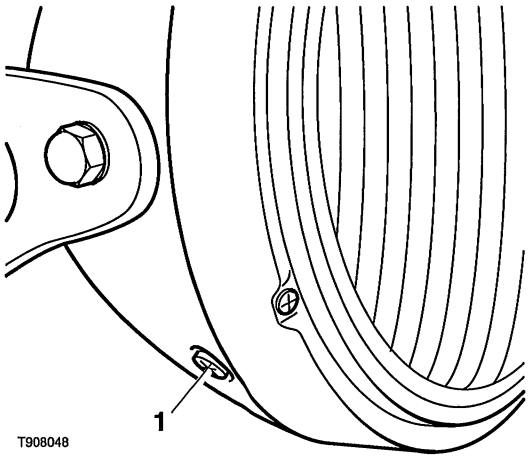
Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Undo the screws and free the headlight rim from the shell.

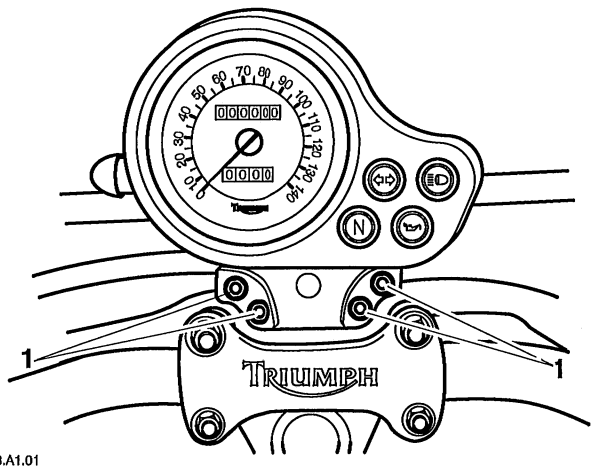


1. Headlight rim screw

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight rim.

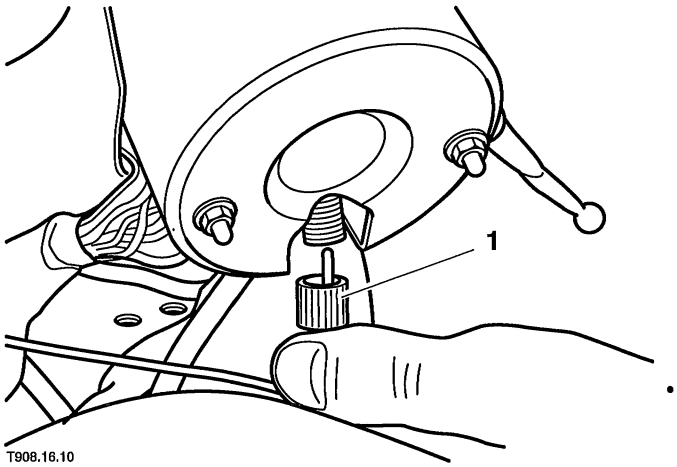
3. Locate the speedometer housing wiring connector inside the headlight shell and disconnect it from the main wiring harness.

4. Unscrew the mounting bolts and free the speedometer housing from the top yoke.



1. Speedometer housing bolts (Bonneville)

5. Unscrew the retaining ring and disconnect the speedometer cable then remove the housing assembly.



1. Speedometer cable retaining ring

Installation

1. Securely reconnect the cable to the speedometer.

2. Locate the housing on the top yoke and tighten its mounting bolts to **9 Nm**.

3. Route the wiring into the headlight shell and reconnect it to the main harness.

4. Reconnect the wiring connectors to the headlight and sidelight bulbs.

5. Seat the headlight rim correctly in its shell and securely tighten its screws.

SPEEDOMETER ASSEMBLY

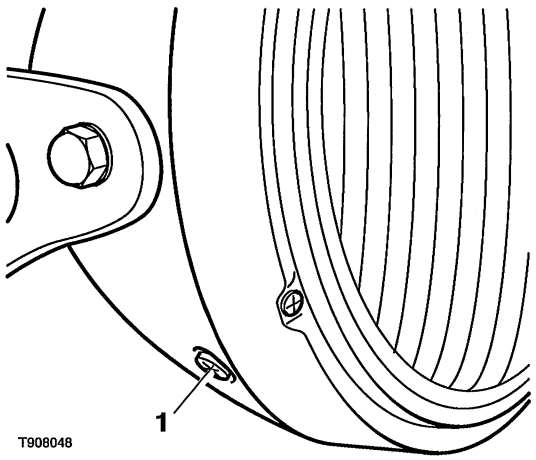
America & Speedmaster

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Undo the screws and free the headlight rim from the shell.

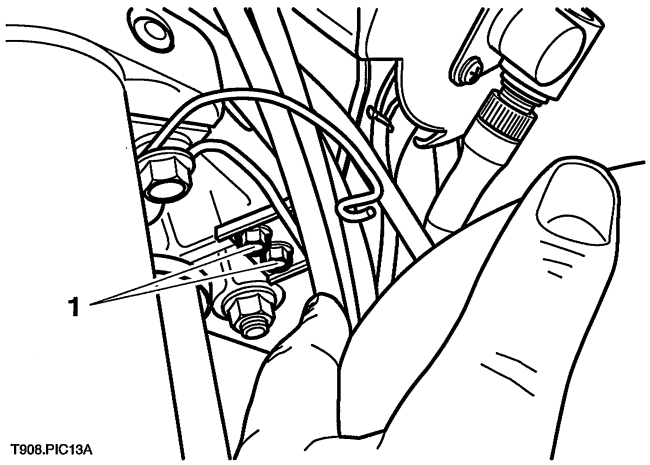


1. Headlight rim screw

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.

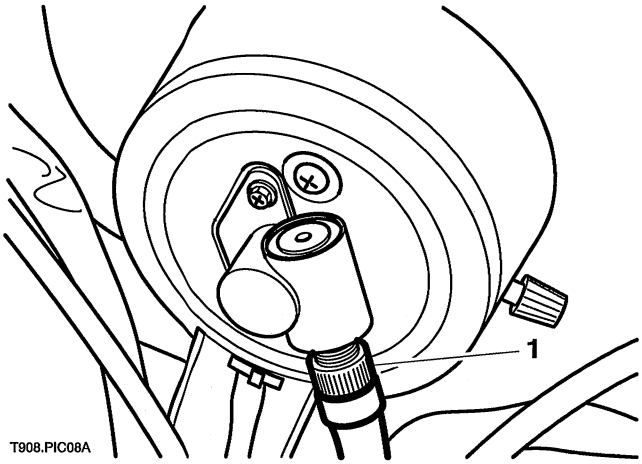
3. Locate the speedometer housing wiring connector inside the headlight shell and disconnect it from the main wiring harness. Free the speedometer wiring from the grommet in the headlight bowl.

4. Unscrew the mounting bolts and free the speedometer housing from the top yoke.



1. Speedometer housing bolts

5. Unscrew the retaining ring and disconnect the speedometer cable then remove the speedometer assembly.



1. Speedometer cable retaining ring

Installation

1. Securely reconnect the cable to the speedometer.

2. Locate the speedometer on the top yoke and tighten its mounting bolts to **9 Nm**.

3. Route the wiring into the headlight shell and reconnect it to the main harness.

4. Reconnect the wiring connectors to the headlight and sidelight bulbs.

5. Seat the headlight rim correctly in its shell and securely tighten its screws.

SPEEDOMETER

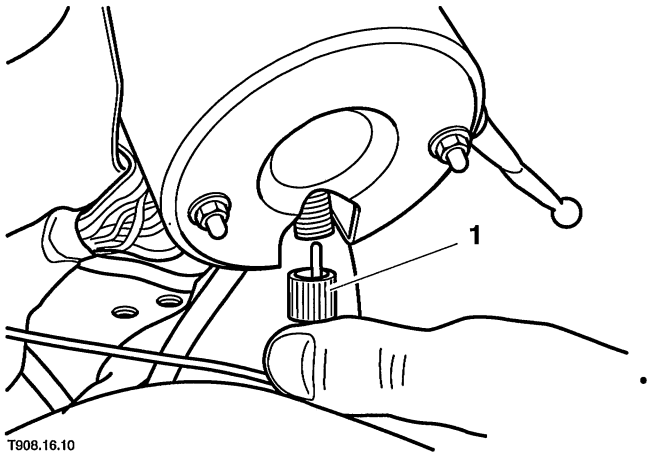
Bonneville, Bonneville T100, Scrambler & Thruxton

NOTE:

- **Read through the safety precautions before proceeding.**

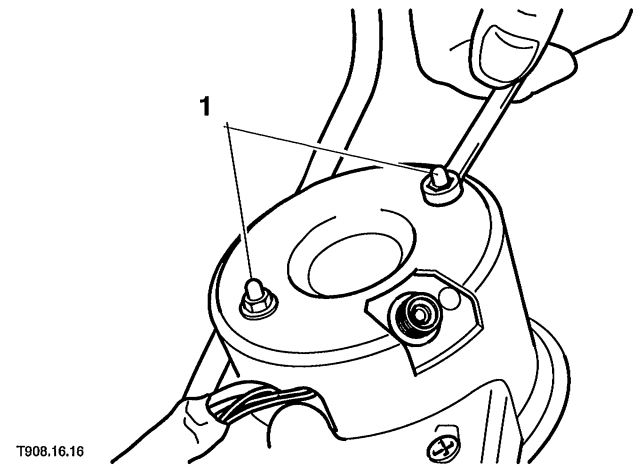
Removal

1. Unscrew the mounting bolts and free the speedometer housing from the top yoke.
2. Unscrew the retaining ring and detach the cable from the speedometer.



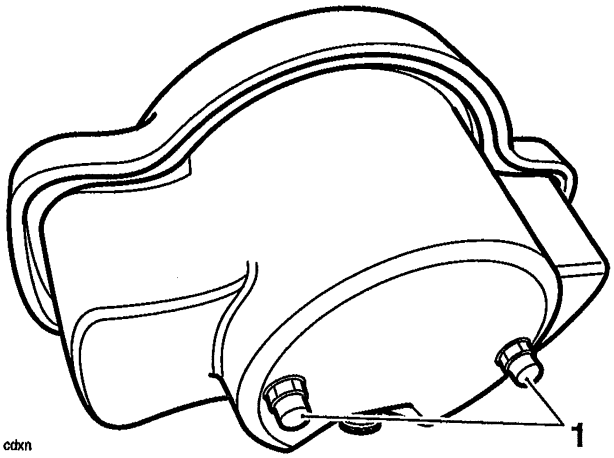
1. Speedometer cable retaining ring

3. All except Scrambler - Unscrew the nuts and washers and remove the cover from the base of the speedometer.



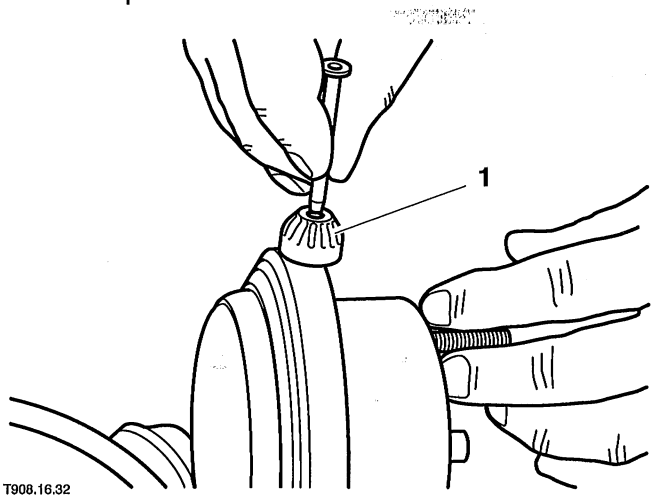
1. Speedometer cover nuts

3. Scrambler only - Undo the two domed nuts and washers and remove the instrument cover to gain access to the bulbholders.



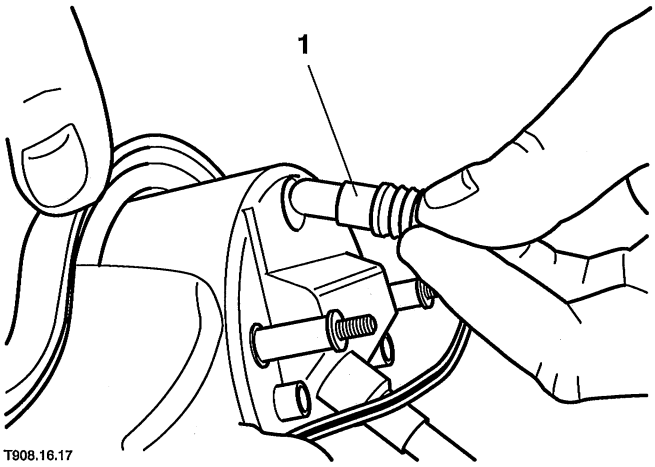
1. Instrument cover nuts and washers (Scrambler)

4. All models - Undo the retaining screw and remove the trip meter reset knob.



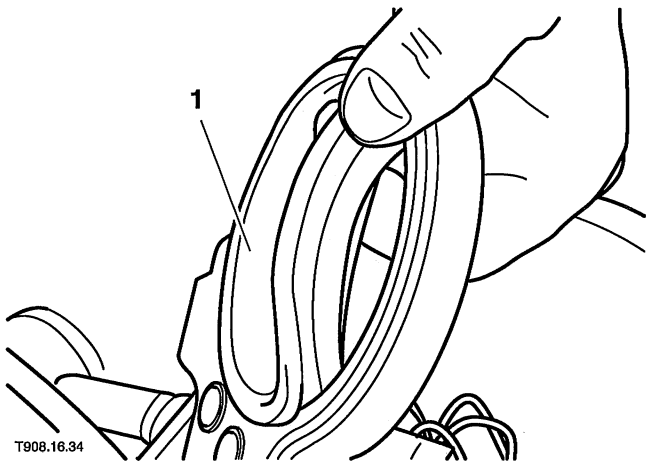
1. Trip meter reset knob

5. Free the relevant bulbholders from the speedometer and lift the speedometer out from the speedometer housing.



1. Bulbholder

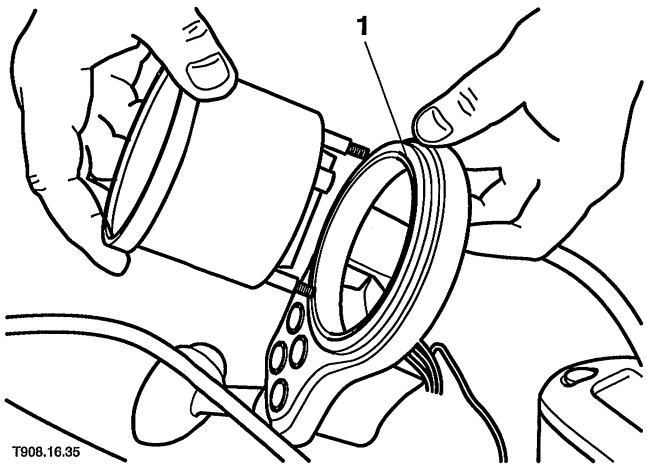
6. Remove the mounting rubber from the housing.



1. Mounting rubber (Bonneville)

Installation

1. Ensure the mounting rubber is correctly fitted then slide the speedometer into the housing.



1. Mounting rubber (Bonneville)

2. Fit the bulbholders then seat the cover on the speedometer. Refit the washer and nuts and tighten securely.

3. Reconnect the speedometer cable and refit the trip meter reset knob.

4. Seat the speedometer housing on the top yoke, tightening its mounting bolts to **9 Nm**.

SPEEDOMETER

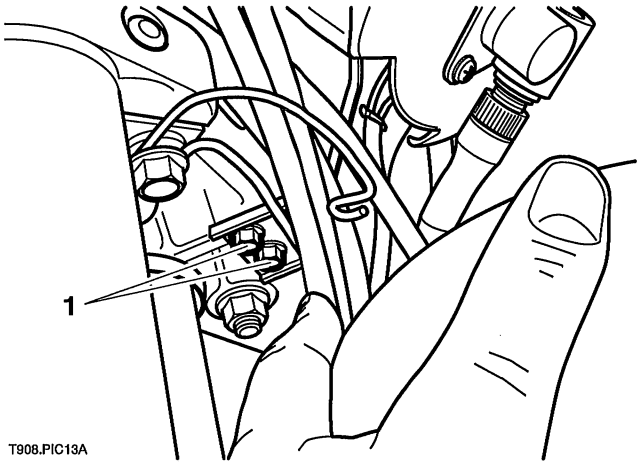
America & Speedmaster

NOTE:

- **Read through the safety precautions before proceeding.**

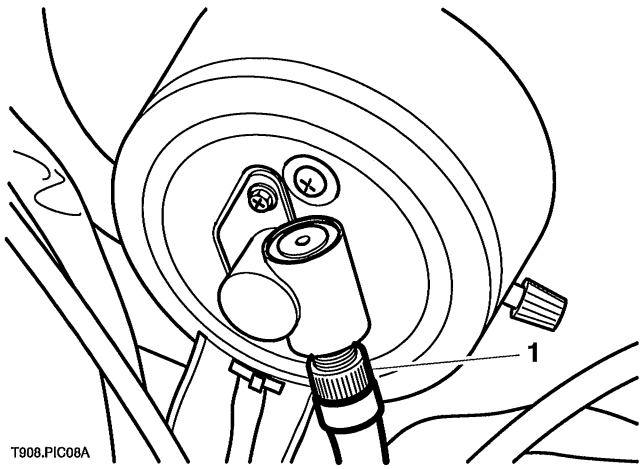
Removal

1. Remove the speedometer as described earlier in this section.



1. Speedometer housing bolts

2. Remove the angle drive from the base of the speedometer.

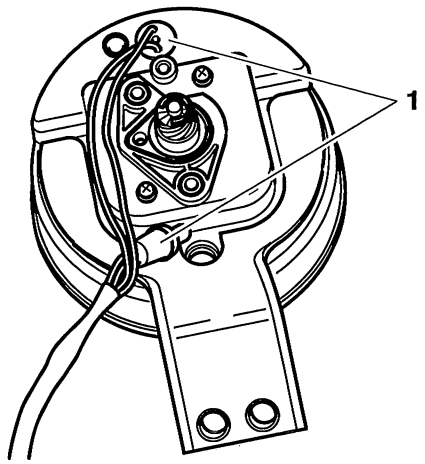


1. Speedometer cable retaining ring

3. Unscrew the fixings and remove the cover from the base of the speedometer.

4. Undo the retaining screw and remove the trip meter reset knob.

5. Free the relevant bulbholders from the speedometer and detach the speedometer.



1. Bulbholder

Installation

1. Fit the bulbholders then seat the cover on the speedometer. Refit the fixings and tighten to **2 Nm.**
2. Refit the trip meter reset knob.
3. Refit the angle drive.
4. Refit the speedometer as described earlier in this section.

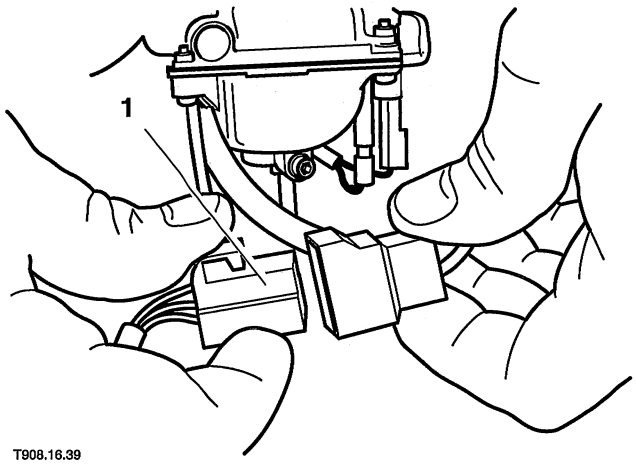
ALTERNATOR

NOTE:

- **Read through the safety precautions before proceeding.**
- **Service tools T3880375 (rotor holder) and T3880325 (rotor puller and protector button) will be required for this procedure.**

Removal

1. Remove the seat and disconnect the battery, disconnecting the negative (-) terminal first.
2. Drain the engine oil (see lubrication section).
3. Trace the wiring back from the alternator and disconnect its connector from the main wiring harness.

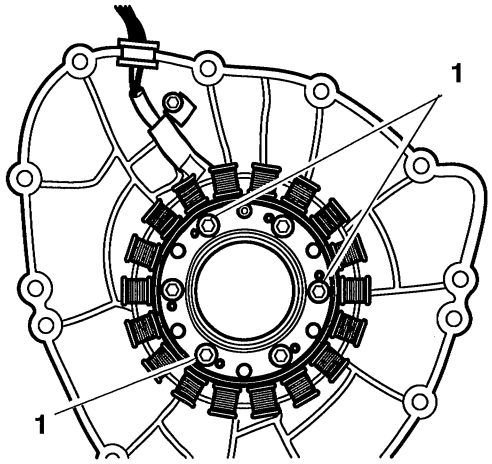


T908.16.39

1. Alternator wiring connector

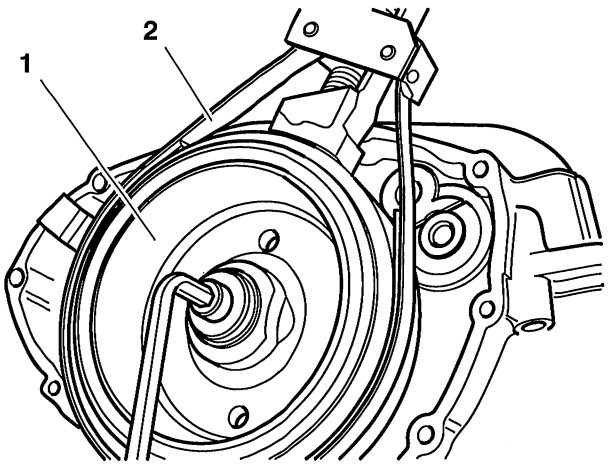
4. Slacken and remove the bolts securing the alternator cover to the right side of the crankcase.
5. Withdraw the cover from the crankcase, against the pull of the alternator rotor, taking care not to lose the locating pins.
6. Remove the cover gasket and discard it.

7. To remove the stator from the cover, unscrew the bolt and remove the wiring clamp then unscrew the three retaining bolts and lift out the stator.



1. Alternator stator bolts

8. To remove the rotor, slacken and remove the rotor bolt and washer from the right-hand end of the crankshaft. Retain the rotor with the holding tool (T3880375) whilst the bolt is slackened.



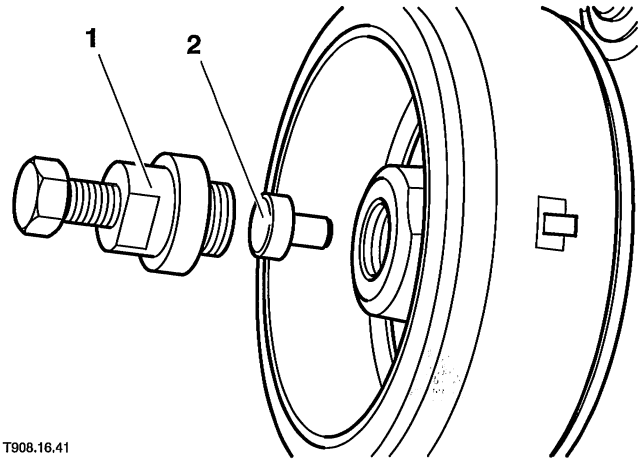
1. Rotor

2. Tool T3880375

NOTE:

- **The are are two sizes of thread protector button depending upon the size of the alternator rotor bolt. Always use the larger button for an M12 bolt and the smaller button if an M10 bolt is fitted.**

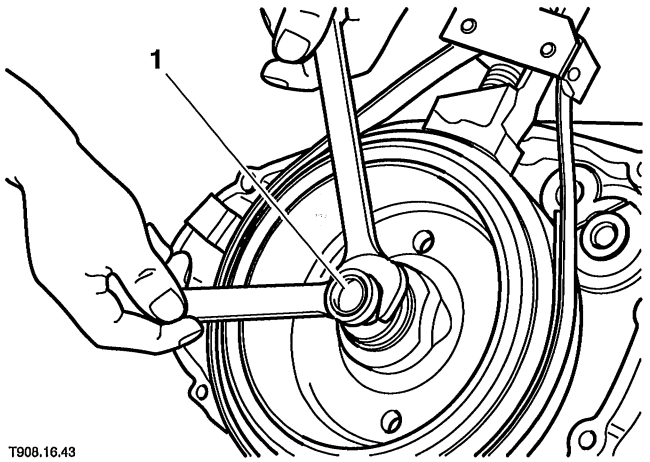
9. Insert the protector button into the end of the crankshaft, then screw the puller (T3880325) into the threads in the centre of the rotor.



1. Service tool T3880325

2. Protector button

10. Hold the puller body and tighten its centre bolt to release the rotor from the crankshaft end.



1. Puller centre bolt

11. Withdraw the rotor and puller as an assembly. Unscrew the puller from the rotor and recover the protector from the end of the crankshaft.

12. Remove the Woodruff key from the crankshaft (if loose).

Installation

1. Ensure the crankshaft taper and rotor mating surfaces are clean and dry.

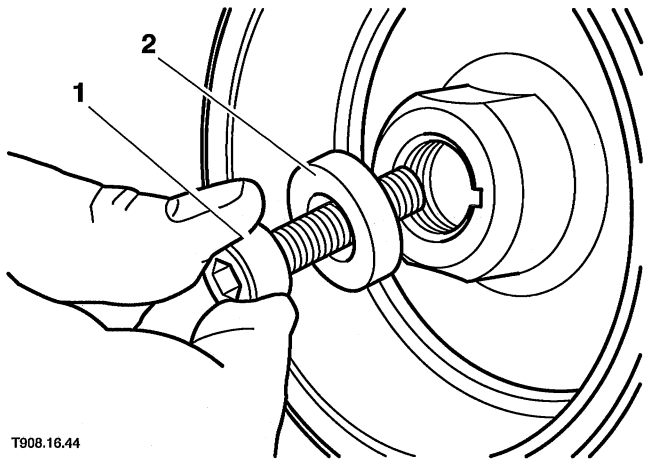
2. Ensure the Woodruff key is securely fitted to the crankshaft groove.

3. Refit the alternator rotor to the crankshaft, aligning its slot with the Woodruff key.

4. Measure the rotor bolt thread diameter to identify its size (it will either be M10 or M12) then refit the bolt and washer to the crankshaft. Use tool T3880375 to prevent crankshaft rotation then tighten the rotor bolt to the specified torque;

   where an **M10 bolt** is fitted the bolt must be tightened to **98 Nm**,

   if an **M12 bolt** is fitted it must be tightened to **120 Nm**.



T908.16.44

1. Bolt

2. Washer

5. Ensure the stator wiring grommet and its location in the cover are clean and dry. Apply silicone sealant (Three Bond 1207B or equivalent) to the grommet then fit the stator to the cover. Locate the wiring grommet in its cutout then tighten the stator bolts to **12 Nm**. Refit the wiring clamp and tighten its bolt to **12 Nm**.

6. Ensure the crankcase and cover mating surfaces are clean and dry. Apply silicone sealant to both the alternator stator and ignition pick-up coil wiring grommets.

7. Fit a new gasket, ensuring the locating pins are in position.

8. Refit the cover and install the bolts. Hand-tighten all bolts then evenly and progressively tighten them to **9 Nm**.

WARNING: Take great care not to trap your fingers between the cover and crankcase. The magnetic pull of the rotor will forcibly draw the cover into position.

9. Reconnect the alternator wiring connector, ensuring it is correctly routed.

10. Refill the engine with oil (see lubrication section).

11. Reconnect the battery, connecting the positive (+) terminal first. Install the seat.

REGULATOR/RECTIFIER UNIT

Bonneville, Bonneville T100, Scrambler & Thruxton

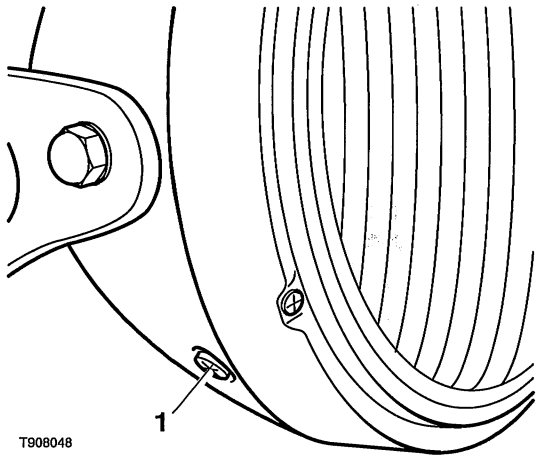
NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the seat and disconnect the battery, disconnecting the negative (-) terminal first.

2. Undo the screws and free the headlight rim from the shell. Support the headlight or disconnect the wiring and remove it.

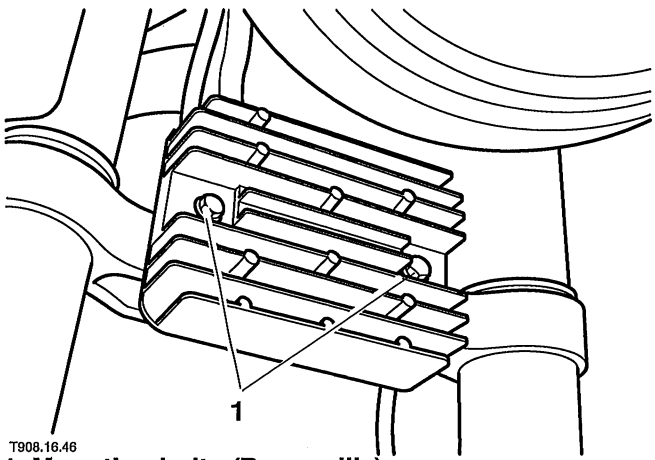


1. Headlight rim screw

3. Locate the regulator/rectifier wiring connector inside the headlight. Disconnect the wiring connector and free it from the rear of the headlight shell.

4. Unscrew the mounting bolts and remove the regulator/rectifier from the bottom yoke.

5. On Thruxton, the mounting bolts also secure the front indicator bracket which must be supported to prevent damage to the indicator wiring.



1. Mounting bolts (Bonneville)

Installation

1. Locate the regulator/rectifier (together with the front indicator bracket on Thruxton models) on the bottom yoke and tighten its mounting bolts to **9 Nm**.
2. Route the wiring back into the headlight shell and reconnect the connector.
3. Seat the headlight rim correctly in its shell and securely tighten its screws.
4. Reconnect the battery, connecting the positive (+) terminal first. Install the seat.

REGULATOR/RECTIFIER UNIT

America & Speedmaster

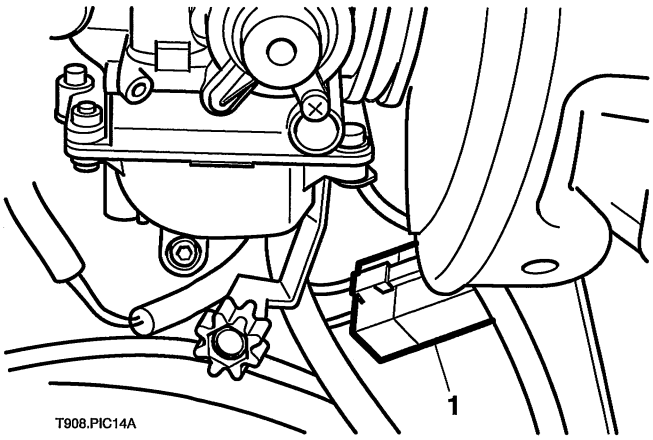
WARNING: Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Disconnect the battery, disconnecting the negative (-) terminal first.
2. Raise and support the rear of the motorcycle.
3. Locate the wiring connection for the regulator which is situated beneath the carburetors. Disconnect the regulator's multiplug.

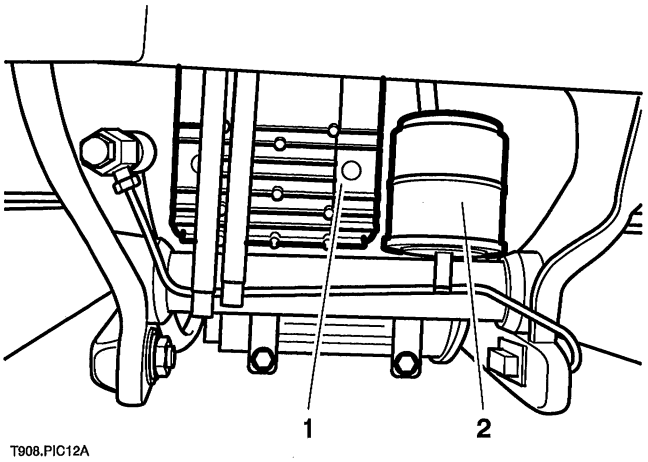


1. Wiring connector

4. Release the fixings and withdraw the regulator.

NOTE:

- **On California models, removal of the evaporative canister creates space for the regulator to be removed.**



T908.PIC12A

1. Regulator

2. Evaporative canister (California models only)

Installation

1. Locate the regulator/rectifier on the bracket and tighten its mounting bolts to **9 Nm**.
2. Route the wiring behind the engine to the space beneath the carburetors.
3. Connect the regulator to the main harness.
4. Refit the evaporative canister if removed.
5. Lower the motorcycle to the ground and park on the sidestand.
6. Reconnect the battery, connecting the positive (+) terminal first.

STARTER MOTOR

All models

NOTE:

- **Read through the safety precautions before proceeding.**
- **Refer to the clutch section for information on the starter drive.**

Removal

1. Disconnect the battery, disconnecting the negative (-) terminal first.
2. Drain the engine oil (see lubrication section).
3. Peel back the rubber cap then unscrew the nut and detach the lead from the starter motor.
4. Unscrew the bolts securing the motor to the crankcase.
5. Slide the motor to the side to release it and remove it from the crankcase.

Installation

1. Inspect the starter motor O-ring for damage and deterioration and renew if necessary.
2. Lubricate the O-ring with clean engine oil then slide the starter motor into position, engaging it with the idler gear.
3. Fit the starter motor mounting bolts and tighten to **10 Nm**.
4. Connect the lead to the starter and tighten its nut to **7 Nm**. Seat the rubber cap back over the terminal.
5. Refill the engine with oil (see lubrication section).
6. Reconnect the battery, connecting the positive (+) terminal first.

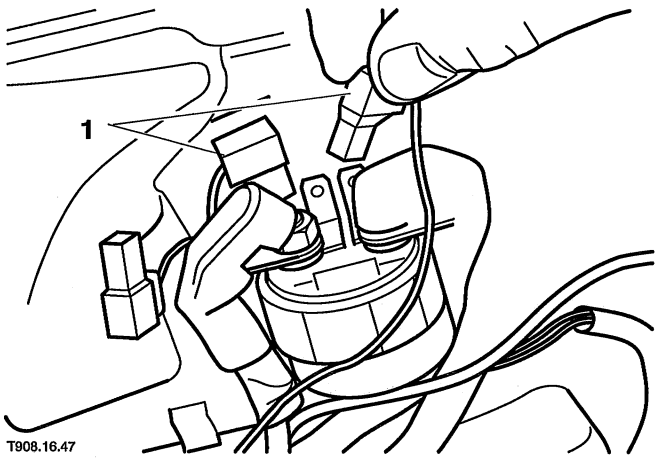
STARTER SOLENOID

NOTE:

- **Read through the safety precautions before proceeding.**

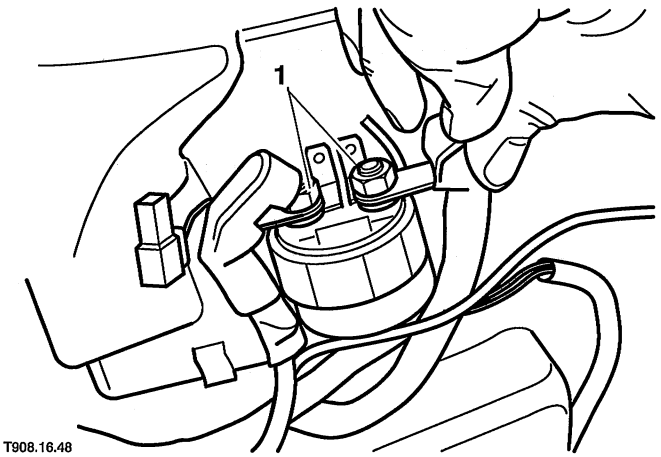
Removal

1. Remove the seat and disconnect the battery, disconnecting the negative (-) terminal first.
2. Remove the left side cover (Bonneville, Bonneville T100, Scrambler & Thruxton) or right side cover (America & Speedmaster).
3. Disconnect the wiring connectors from the solenoid.



1. Wiring connectors

4. Slacken and remove the nuts and washers and detach the battery and starter leads from the solenoid.



1. Battery/starter lead nuts

5. Free the solenoid mounting rubber from the airbox and remove the solenoid from the motorcycle.

Installation

1. Fit the solenoid and mounting rubber, locating the rubber on the tabs on the airbox.
2. Reconnect the wiring connectors and leads to the relay, tightening the terminal nuts to **7 Nm.**
3. Refit the side cover.
4. Reconnect the battery, connecting the positive (+) terminal first. Install the seat.

IGNITION SYSTEM DESCRIPTION

The ignition system fitted to all models in this manual is a digital electronic type. Within the system there are four major components as follows.

- Pick-Up Coil
- Throttle Position Sensor.
- Igniter Unit
- Ignition HT Coil

There are two separate sections to the ignition system, the low voltage primary circuit which contains the pick-up coil, igniter unit and the wiring to the ignition HT coil, and the high voltage secondary circuit which consists of the ignition HT coil, the plug leads and caps and the spark plugs. The system operates as follows.

- **Pick-up coil**

The pick-up coil is mounted on the right-hand side of the crankcase and is operated by the raised projections on the outside of the alternator rotor. As each projection passes the coil, a signal of low voltage electricity is sent to the igniter unit.

- **Throttle position sensor**

The throttle position sensor is mounted on the right-hand side of the carburettors, on the end of the throttle valve spindle. The resistance of the sensor varies depending on the throttle valve spindle position.

- **Igniter unit**

The igniter unit evaluates the signals received from the pick-up coil, which informs it of engine speed and piston position, and the throttle position sensor, which informs it of throttle valve position. From these signals, the igniter unit calculates the correct ignition timing and supplies the required charging voltage to the HT coil. The basis for the calculations come from pre-programmed ignition parameters within the igniter unit.

- **Ignition HT coil**

A HT coil with a low resistance primary winding is fitted to allow a more rapid coil action than found in conventional coils. This rapid action allows the coil to function correctly at both low and high engine speeds.

The HT coil operates on the 'wasted-spark' principle with both spark plugs being fired twice for each engine cycle (once on the compression stroke and once on the exhaust stroke).

IGNITION PICK-UP COIL

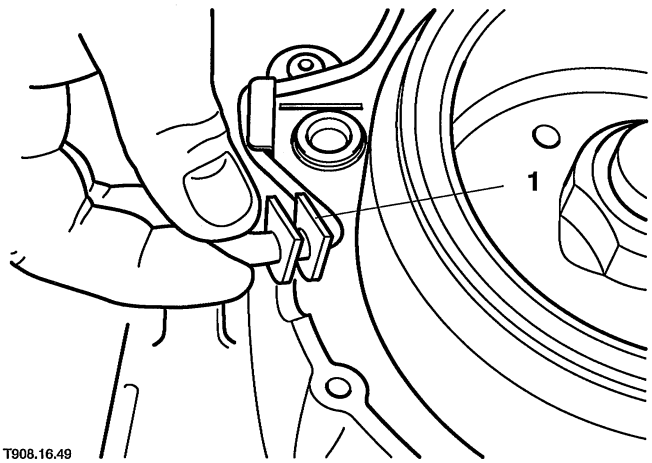
All models

NOTE:

- **Read through the safety precautions before proceeding.**

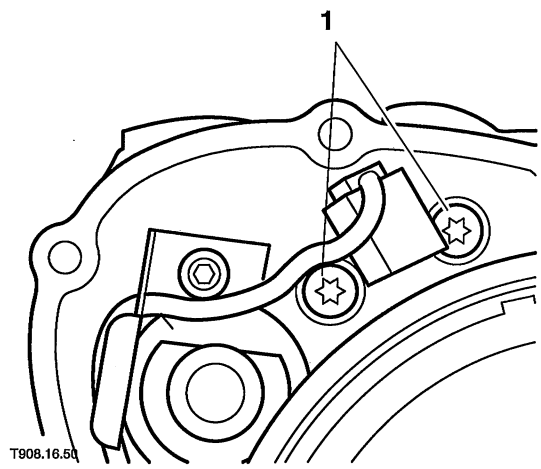
Removal

1. Disconnect the battery, negative (-) terminal first.
2. Remove the alternator cover (see alternator removal).
3. Trace the wiring back from the pick-up coil and disconnect its connector from the main wiring harness.
4. Free the pick-up coil wiring grommet from the case and unhook the wiring from behind its guide.



1. Wiring grommet

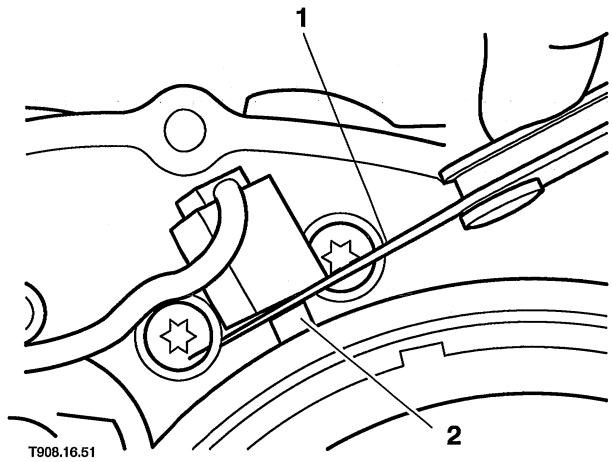
5. Undo the retaining screws and remove the pick-up coil from the crankcase.



1. Pick-up coil screws

Installation

1. Ensure the wiring grommet and crankcase cutout are clean and dry.
2. Apply silicone sealant (Three Bond 1207B is used at the factory) to the grommet then locate the grommet in its cutout.
3. Route the wiring correctly behind the guide fitted to the rear balancer shaft screw then seat the coil on the crankcase. Fit the coil screws and hand-tighten.
4. Align one of the projections on the alternator rotor with the pick-up coil trigger. Set the clearance (air gap) between the projection and trigger to 1.0 mm +/- 0.2 mm then tighten the coil screws to **10 Nm**. Recheck the clearance and readjust, if necessary.



1. Feeler gauge

2. Rotor projection

5. Reconnect the pick-up coil wiring connector.
6. Install the alternator cover (see alternator installation).
7. Reconnect the battery, positive (red) lead first.

THROTTLE POSITION SENSOR

All models

The throttle position sensor is an integral part of the carburettors and is not available separately. If the sensor is faulty, the carburettors must be renewed.

> ⚠ **CAUTION: Never slacken the throttle position sensor screws (the sensor is retained by tamperproof screws). If the screws are slackened, the sensor adjustment will be disturbed. This will result in an incorrect signal being sent to the igniter unit, which will affect the efficiency of the ignition system.**

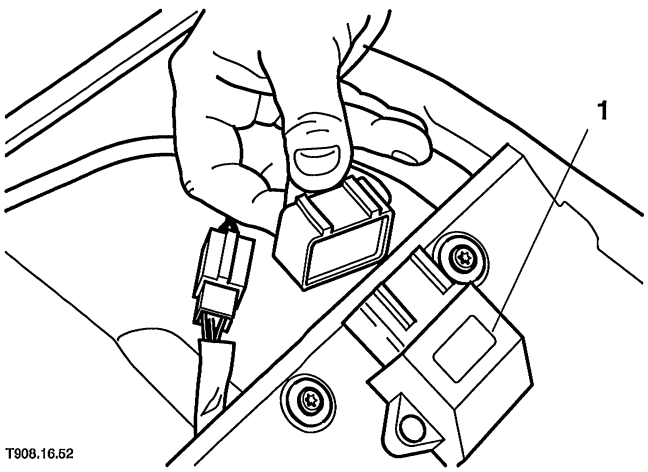
IGNITER UNIT

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the seat and disconnect the battery, disconnecting the negative (-) terminal first.
2. Disconnect the wiring connector then unscrew the retaining nut and remove the igniter unit from the frame.



1.Igniter unit

Installation

1. Locate the igniter unit on the frame and tighten its retaining nut to **9 Nm**.
2. Securely reconnect the igniter wiring connector.
3. Reconnect the battery, connecting the positive (+) terminal first. Install the seat.

IGNITION HT COIL(S)

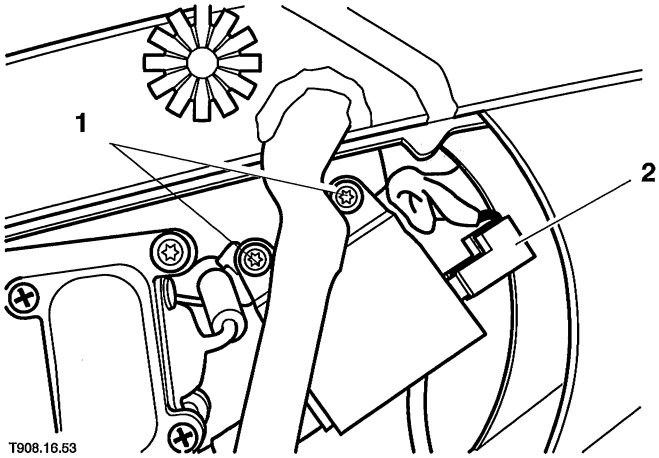
All models

NOTE:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the seat and disconnect the battery, disconnecting the negative (-) terminal first.
2. Remove the fuel tank (see fuel system/exhaust section)
3. Disconnect the wiring connectors from the coil(s).



1. Mounting screws

2. Wiring connectors

4. Free the plug caps from the spark plugs.
5. Undo the screws and remove the ignition HT coil(s).

Installation

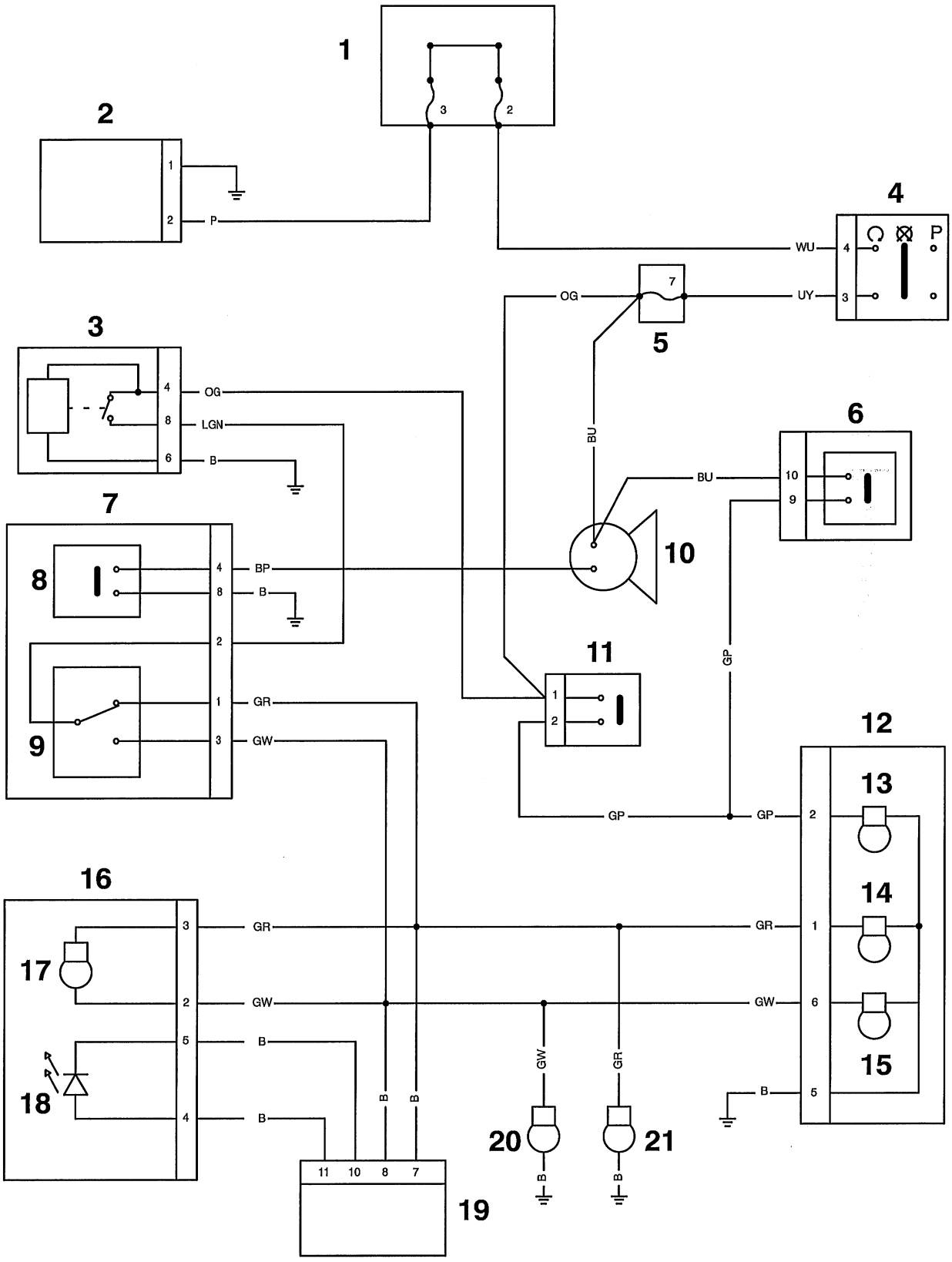
1. Fit the coil(s) to the frame and securely tighten its screws.
2. Reconnect the wiring connectors to the coil(s) and reconnect the plug caps to the spark plugs.
3. Install the fuel tank (see fuel system/exhaust section).
4. Reconnect the battery, connecting the positive (+) terminal first.

Key to auxiliary circuit diagram - Bonneville, Bonneville T100, Scrambler & Thruxton

Item number	Description
1	Fuses 2 & 3
2	Accessory socket
3	Direction indicator unit
4	Ignition switch
5	Fuse 7
6	Front brake lever switch
7	Left hand switch cube
8	Horn button
9	Direction indicator switch
10	Horn
11	Rear brake lever switch
12	Rear light
13	Brake light
14	Left hand rear direction indicator
15	Right hand rear direction indicator
16	Instrument assembly
17	Indicator warning light
18	Alarm LED
19	Alarm control unit
20	Right hand front indicator
21	Left hand front indicator

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Auxiliary Circuit - Bonneville, Bonneville T100, Scrambler & Thruxton

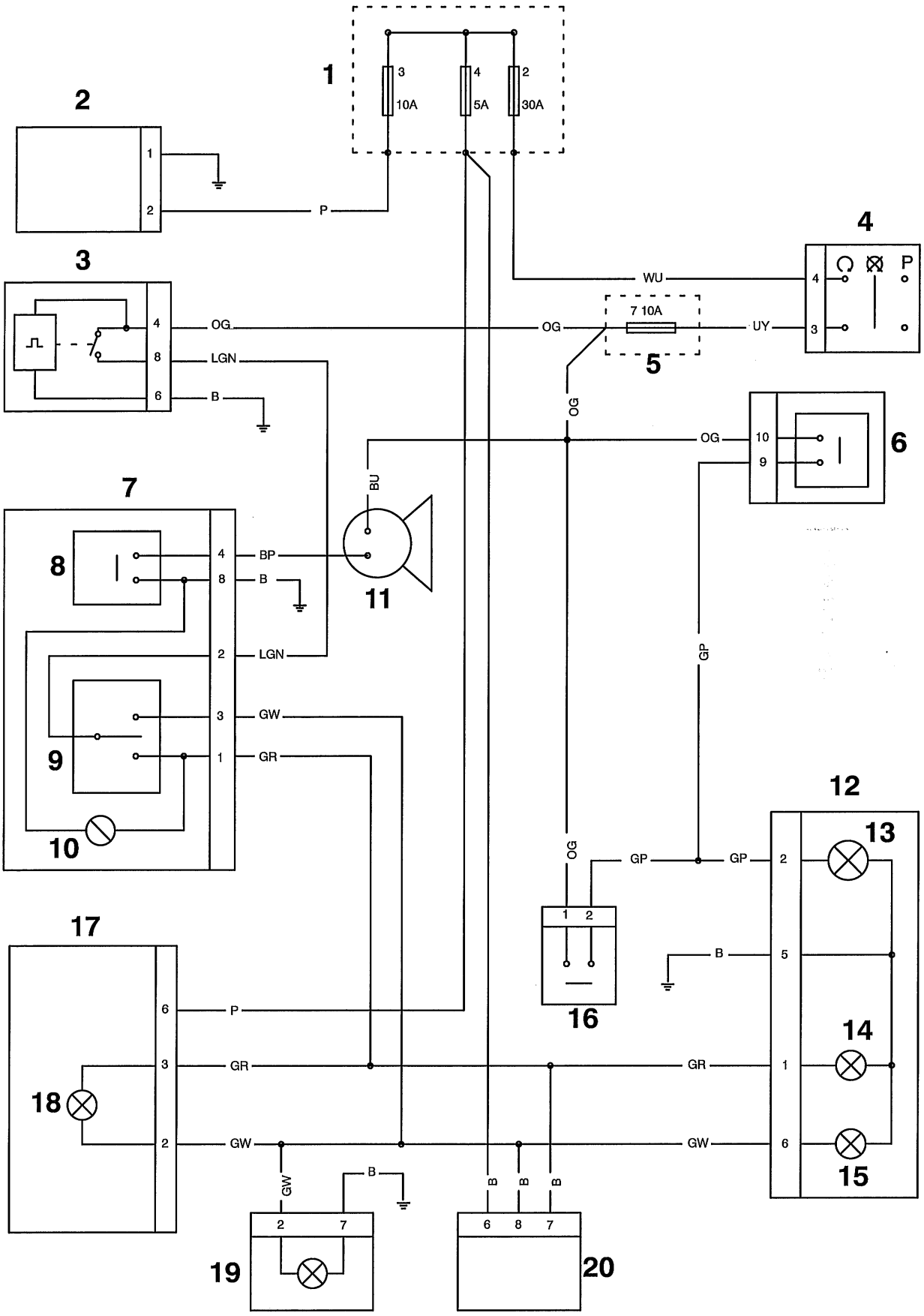


Key to auxiliary circuit diagram - America & Speedmaster

Item number	Description
1	Fuses 2, 3 and 4
2	Accessory socket
3	Direction indicator unit
4	Ignition switch
5	Fuse 7
6	Front brake lever switch
7	Left hand switch cube
8	Horn button
9	Direction indicator switch
10	Left hand front indicator
11	Horn
12	Rear light
13	Brake light
14	Left hand rear indicator
15	Right hand rear indicator
16	Rear brake lever switch
17	Warning light panel
18	Indicator warning light
19	Right hand front indicator
20	Alarm control unit

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Auxiliary Circuit - America & Speedmaster

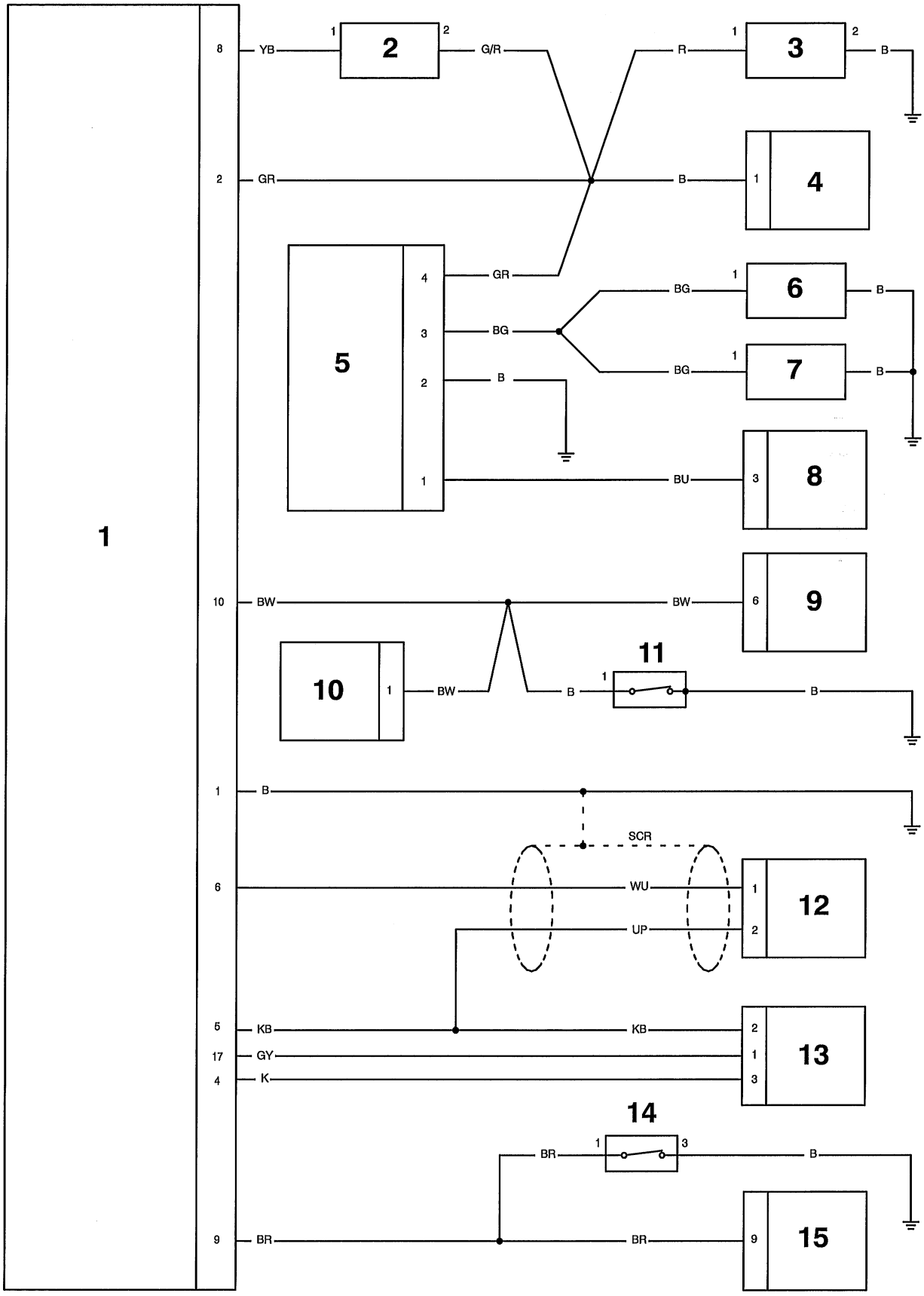


Key to ignition circuit diagram - Bonneville

Item number	Description
1	Igniter
2	Ignition coil
3	Carburettor vent valve
4	Alarm control unit
5	Carburettor thermostat switch
6	Carburettor heater 1
7	Carburettor heater 2
8	Alternator
9	Instrument assembly
10	Diode pack
11	Neutral switch
12	Crankshaft position sensor
13	Throttle position sensor
14	Sidestand switch
15	Clutch switch

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Ignition Circuit - Bonneville

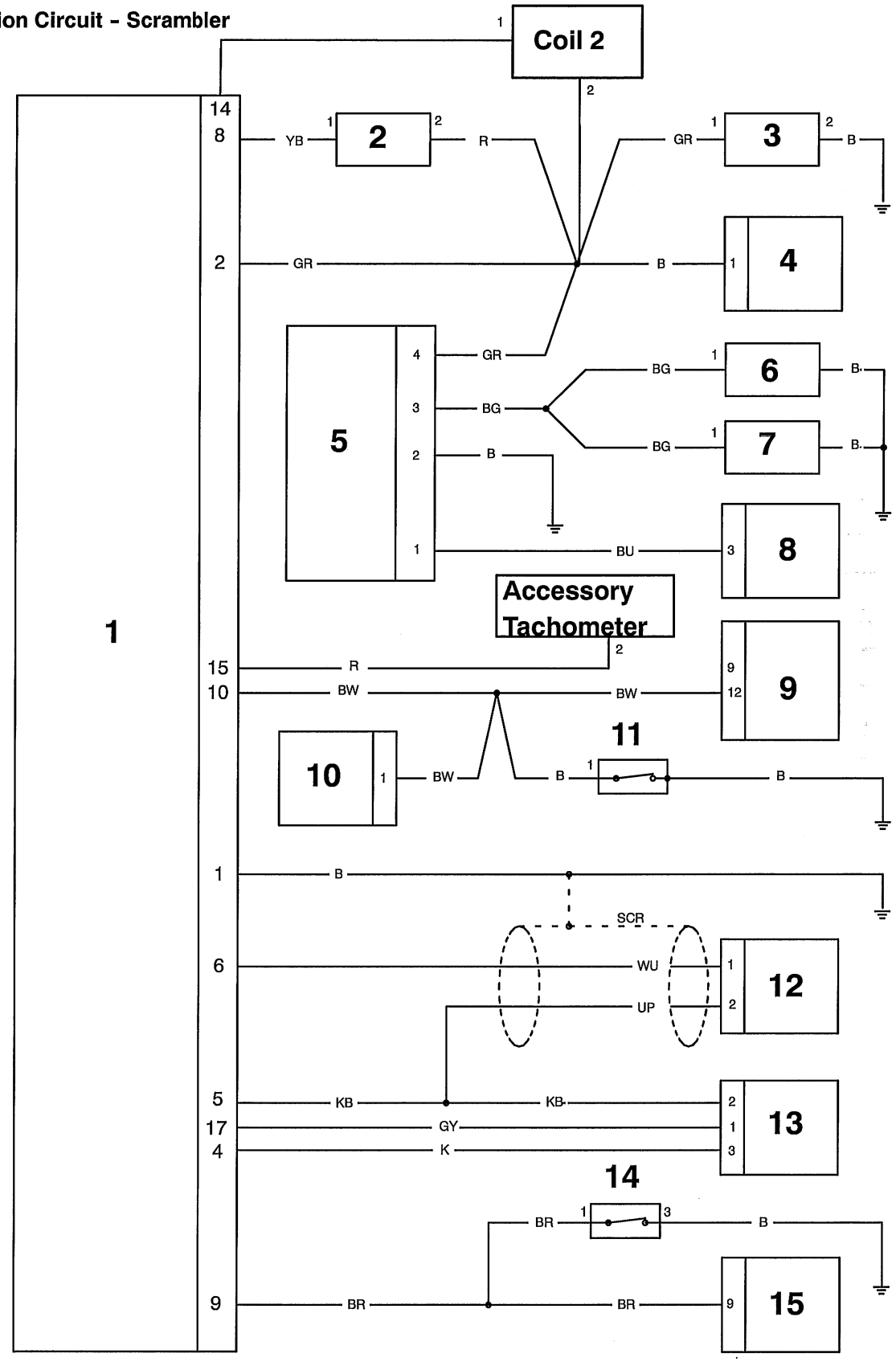


Key to ignition circuit diagram - Scrambler

Item number	Description
1	Igniter
2	Ignition coil #1
3	Carburettor vent valve
4	Alarm control unit
5	Carburettor thermostat switch
6	Carburettor heater 1
7	Carburettor heater 2
8	Alternator
9	Instrument assembly
10	Diode pack
11	Neutral switch
12	Crankshaft position sensor
13	Throttle position sensor
14	Sidestand switch
15	Clutch switch
16	Ignition coil #2
17	Accessory tachometer A

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Ignition Circuit - Scrambler

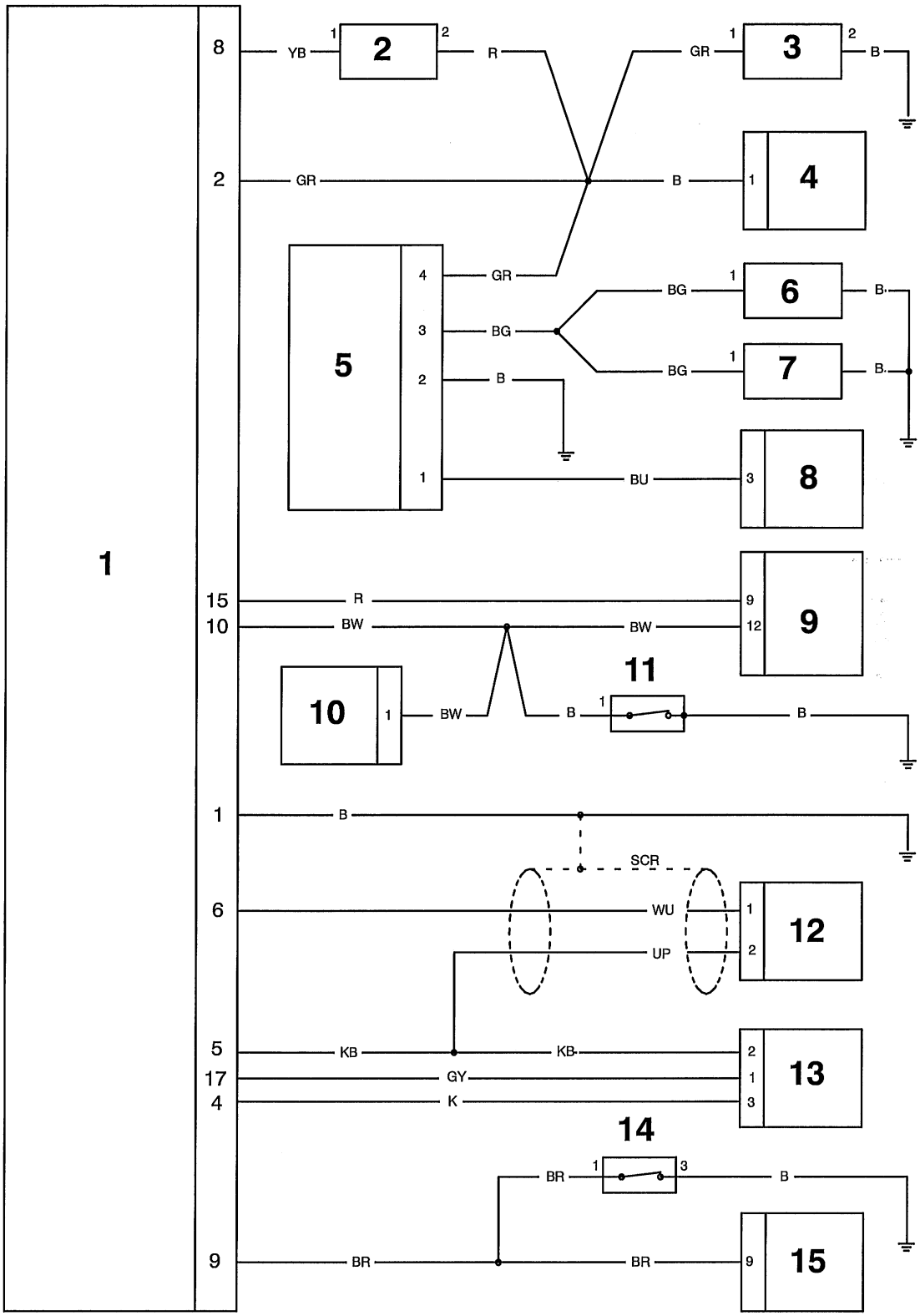


Key to ignition circuit diagram - Bonneville T100 & Thruxton

Item number	Description
1	Igniter
2	Ignition coil
3	Carburettor vent valve
4	Alarm control unit
5	Carburettor thermostat switch
6	Carburettor heater 1
7	Carburettor heater 2
8	Alternator
9	Instrument assembly
10	Diode pack
11	Neutral switch
12	Crankshaft position sensor
13	Throttle position sensor
14	Sidestand switch
15	Clutch switch

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Ignition Circuit - Bonneville T100 & Thruxton

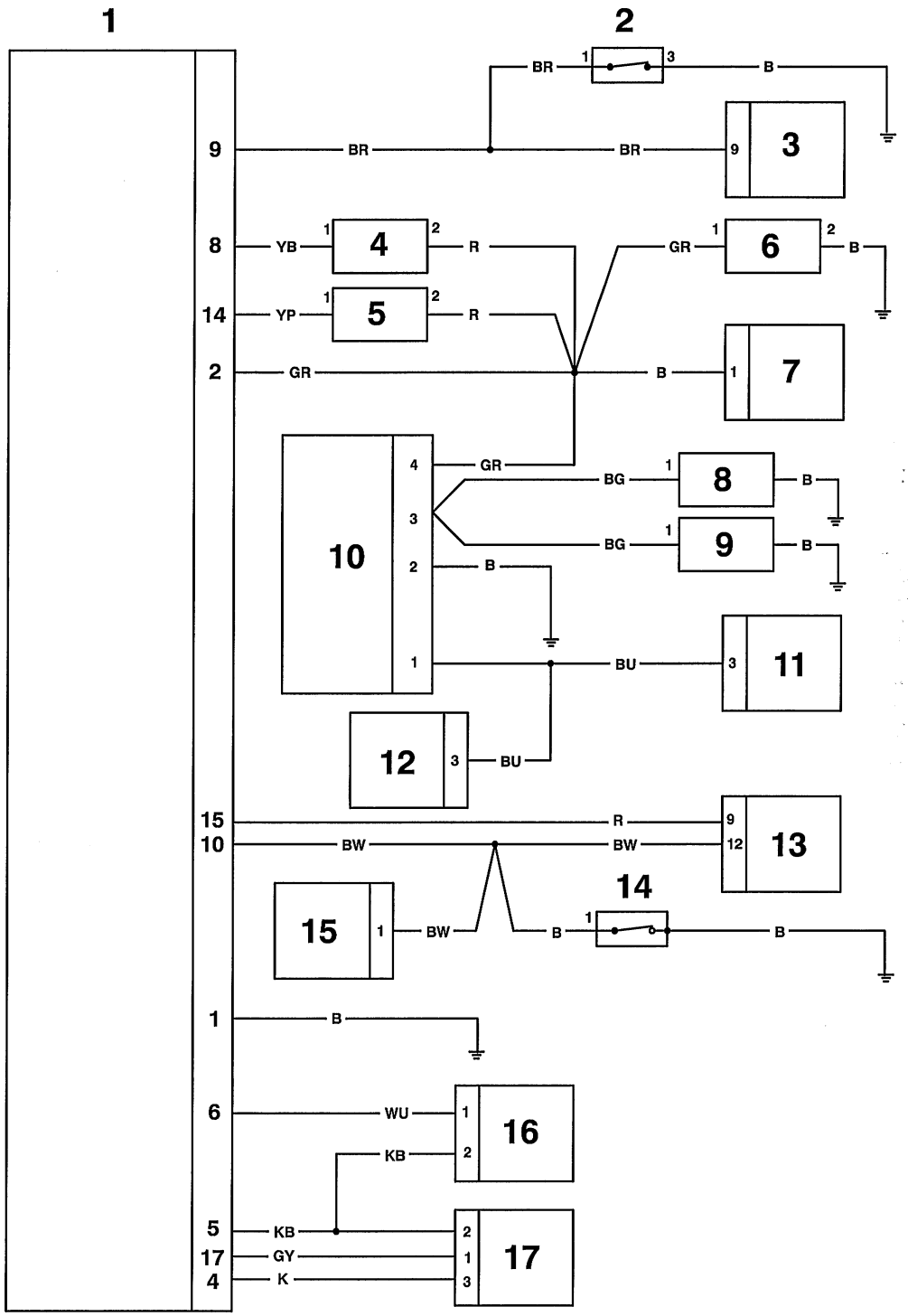


Key to ignition circuit diagram - America & Speedmaster

Item number	Description
1	Igniter
2	Sidestand switch
3	Clutch switch
4	Ignition coil 1
5	Ignition coil 2
6	Carburettor vent valve
7	Alarm control unit
8	Carb heater 1
9	Carb heater 2
10	Carb heater thermostat switch
11	Alternator
12	Rectifier/regulator
13	Instrument assembly
14	Neutral switch
15	Diode pack
16	Crankshaft sensor
17	Throttle position sensor

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Ignition Circuit - America & Speedmaster

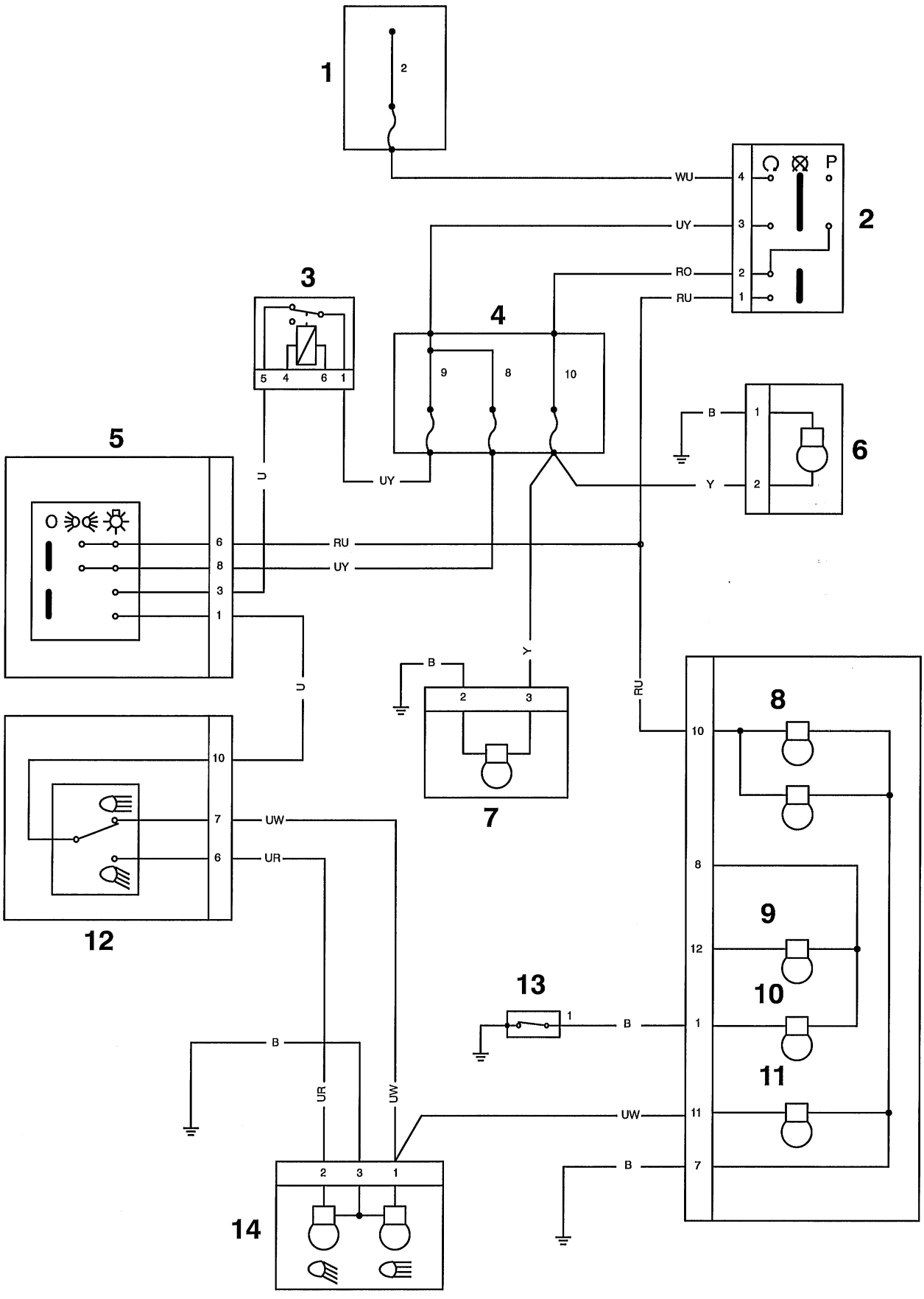


Key to lighting circuit diagram - Bonneville/T100 (fitted with headlight switch)

Item number	Description
1	Fuse 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 and 10
5	Main lighting switch/Pass switch
6	Front position light
7	Rear light
8	Speedometer illumination
9	Neutral light
10	Low oil pressure warning light
11	Main beam warning light
12	Headlight dip switch
13	Low oil pressure warning light switch
14	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - Bonneville/T100 (fitted with headlight switch)

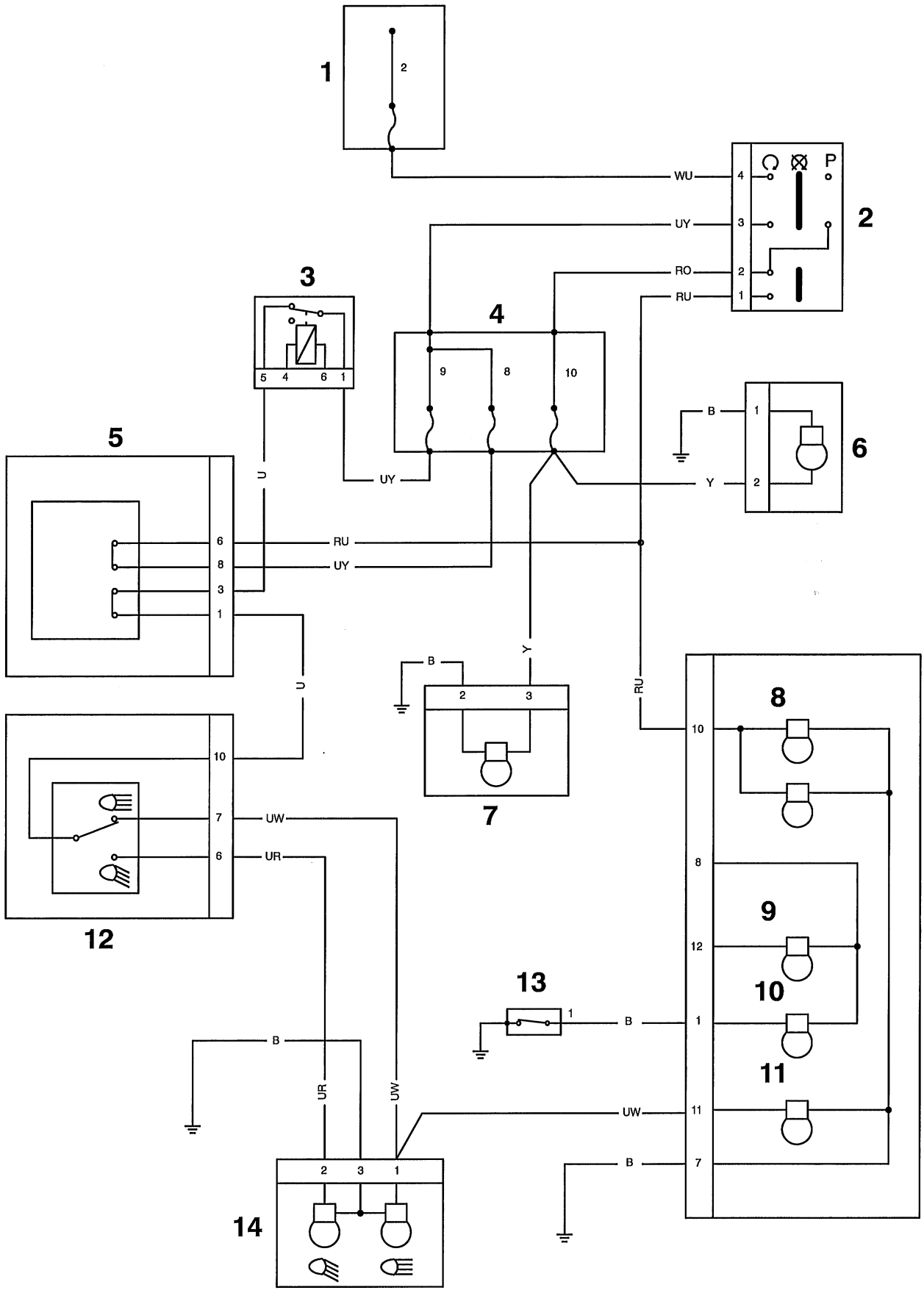


Key to lighting circuit diagram - Bonneville/T100 (Headlights on)

Item number	Description
1	Fuse 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 and 10
5	Right hand switch cube
6	Front position light
7	Rear light
8	Speedometer illumination
9	Neutral light
10	Low oil pressure warning light
11	Main beam warning light
12	Headlight dip switch
13	Low oil pressure warning light switch
14	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - Bonneville/T100 (headlights on)

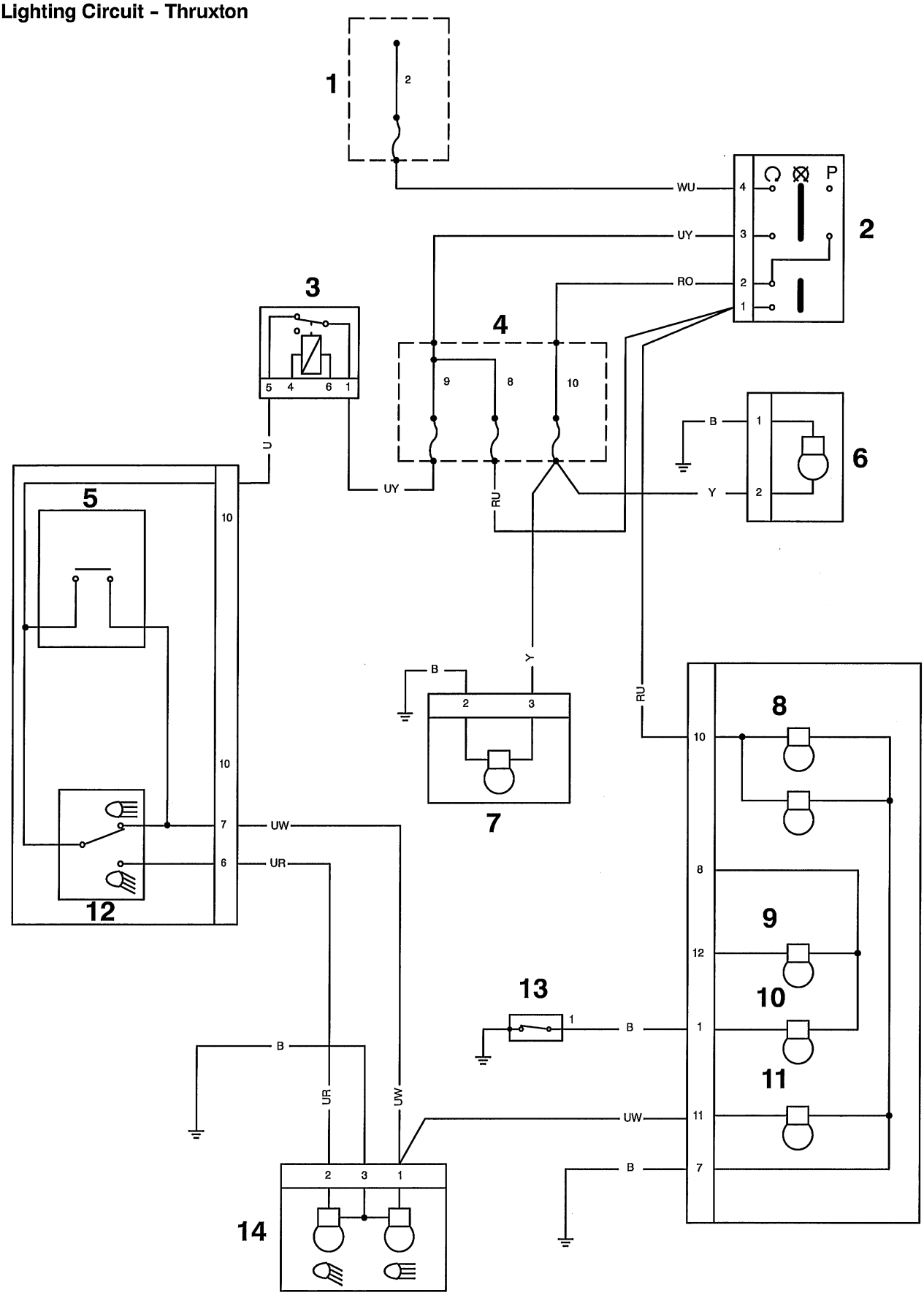


Key to lighting circuit diagram - Thruxton

Item number	Description
1	Fuse 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 and 10
5	Pass switch
6	Front position light
7	Rear light
8	Speedometer illumination
9	Neutral light
10	Low oil pressure warning light
11	Main beam warning light
12	Headlight dip switch
13	Low oil pressure warning light switch
14	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - Thruxton

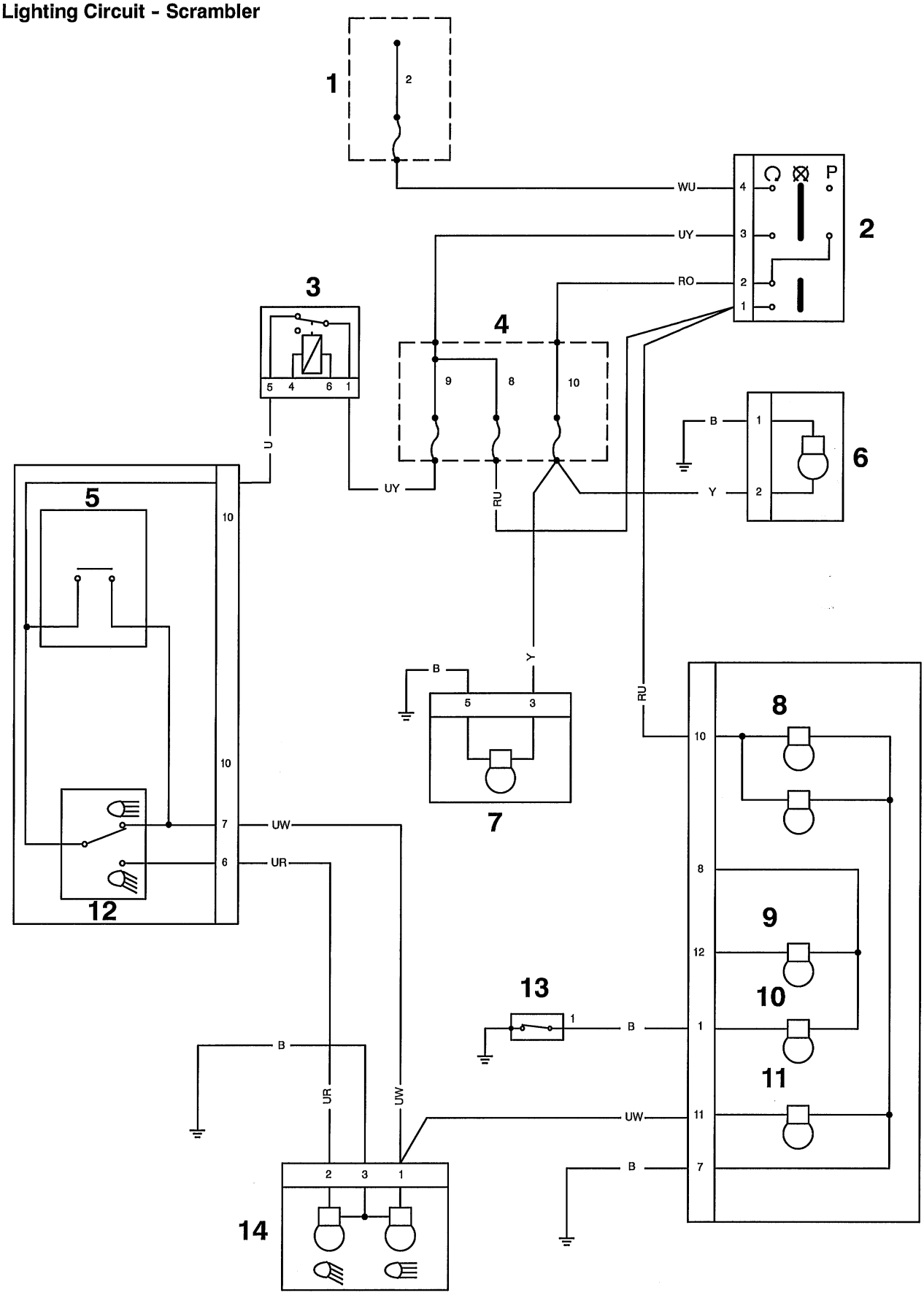


Key to lighting circuit diagram - Scrambler

Item number	Description
1	Fuse 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 and 10
5	Pass switch
6	Front position light
7	Rear light
8	Speedometer illumination
9	Neutral light
10	Low oil pressure warning light
11	Main beam warning light
12	Headlight dip switch
13	Low oil pressure warning light switch
14	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - Scrambler

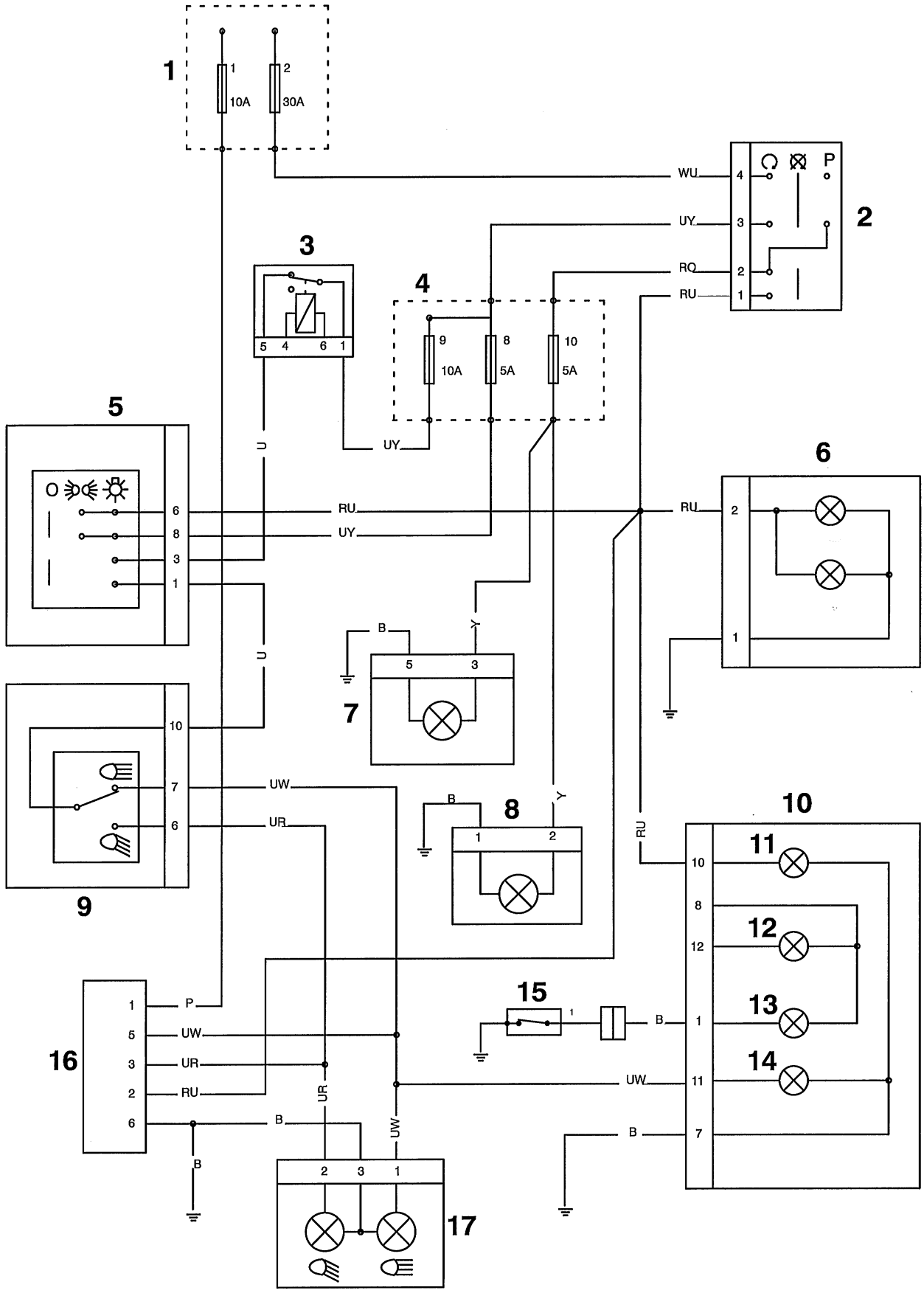


Key to lighting circuit diagram - America & Speedmaster (fitted with headlight switch)

Item number	Description
1	Fuses 1 & 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 & 10
5	Main lighting switch/Pass switch
6	Speedometer illumination
7	Rear light
8	Front position light
9	Headlight dip-switch
10	Fuel tank console
11	Clock illumination (accessory) or tachometer illumination (Speed-master)
12	Neutral warning light
13	Oil pressure warning light
14	Main beam warning light
15	Oil pressure switch
16	Accessory light connection
17	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - America & Speedmaster (fitted with headlight switch)

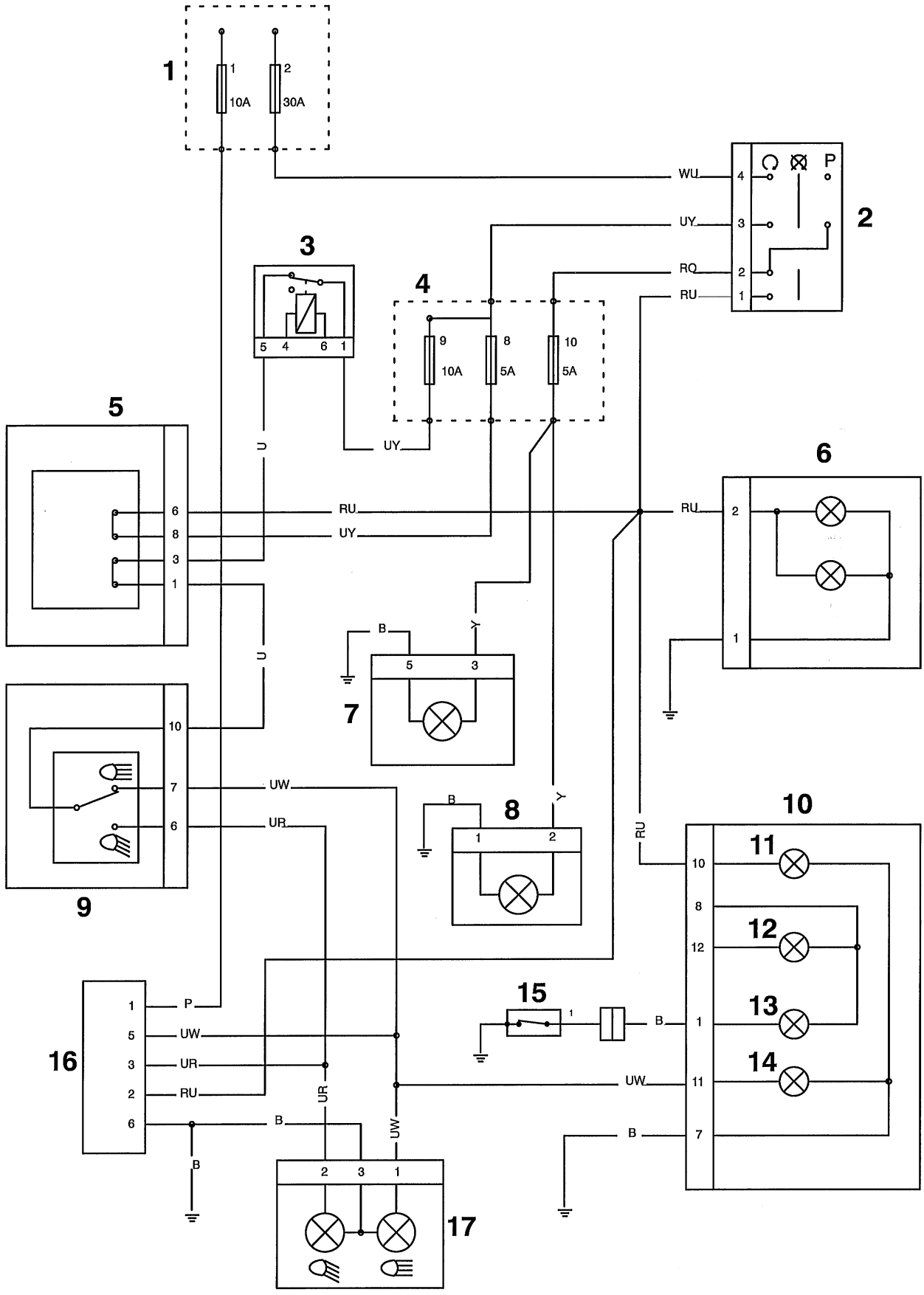


Key to lighting circuit diagram - America & Speedmaster (headlights on)

Item number	Description
1	Fuses 1 & 2
2	Ignition switch
3	Starter relay
4	Fuses 8, 9 & 10
5	Right hand switch cube
6	Speedometer illumination
7	Rear light
8	Front position light
9	Headlight dip-switch
10	Fuel tank console
11	Clock illumination (accessory) or tachometer illumination (Speed-master)
12	Neutral warning light
13	Oil pressure warning light
14	Main beam warning light
15	Oil pressure switch
16	Accessory light connection
17	Headlight

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Lighting Circuit - America & Speedmaster (headlights on)

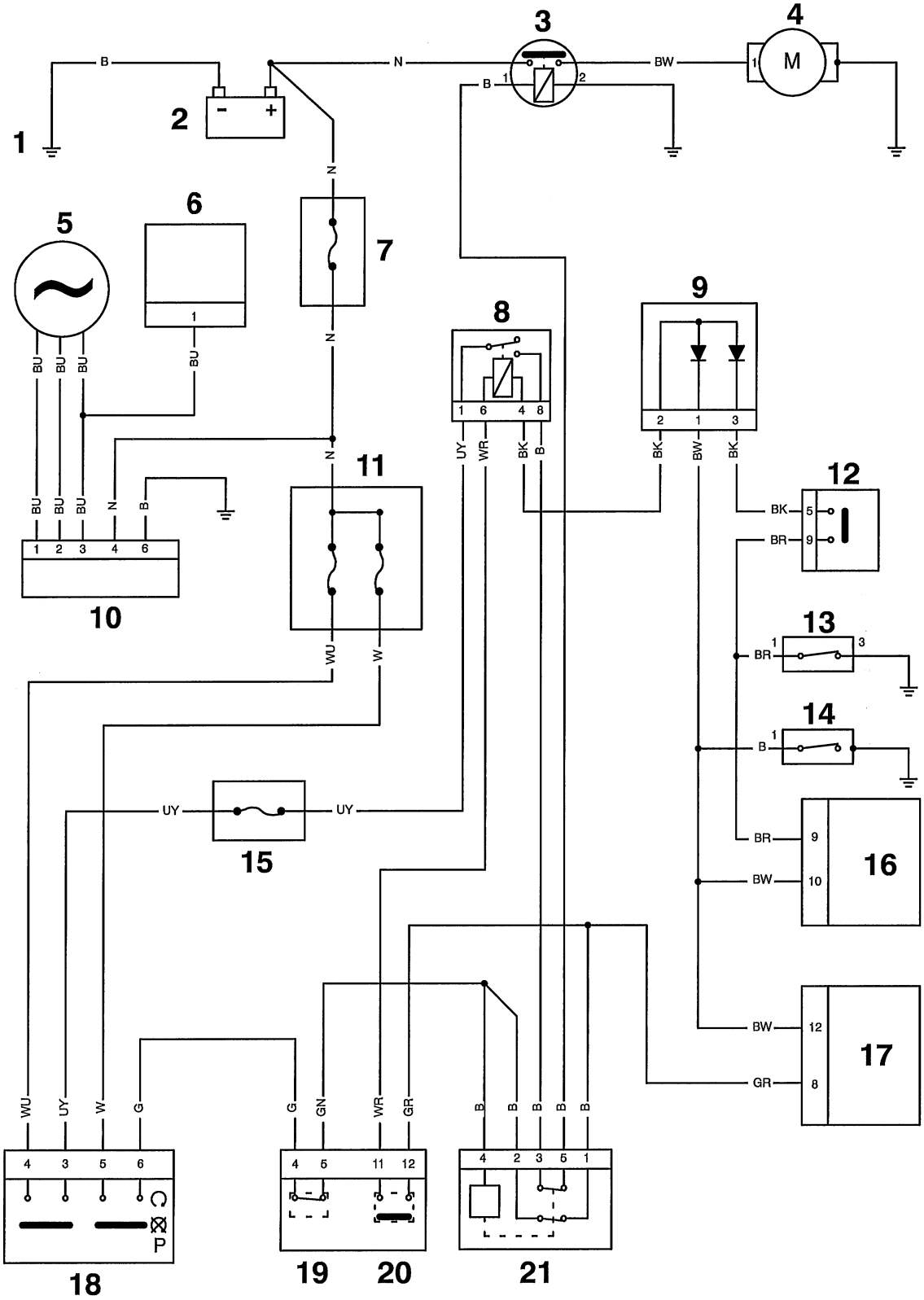


Key to starting/charging circuit diagram - Bonneville

Item number	Description
1	Engine earth
2	Battery
3	Starter solenoid
4	Starter motor
5	Alternator
6	Carburettor thermostat switch
7	Fuse 11
8	Starter relay
9	Diode pack
10	Rectifier regulator
11	Fuses 2 and 5
12	Clutch switch
13	Sidestand switch
14	Neutral switch
15	Fuse 9
16	Igniter
17	Instrument assembly
18	Ignition switch
19	Engine kill switch
20	Starter button
21	Alarm control unit

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Starting/Charging - Bonneville

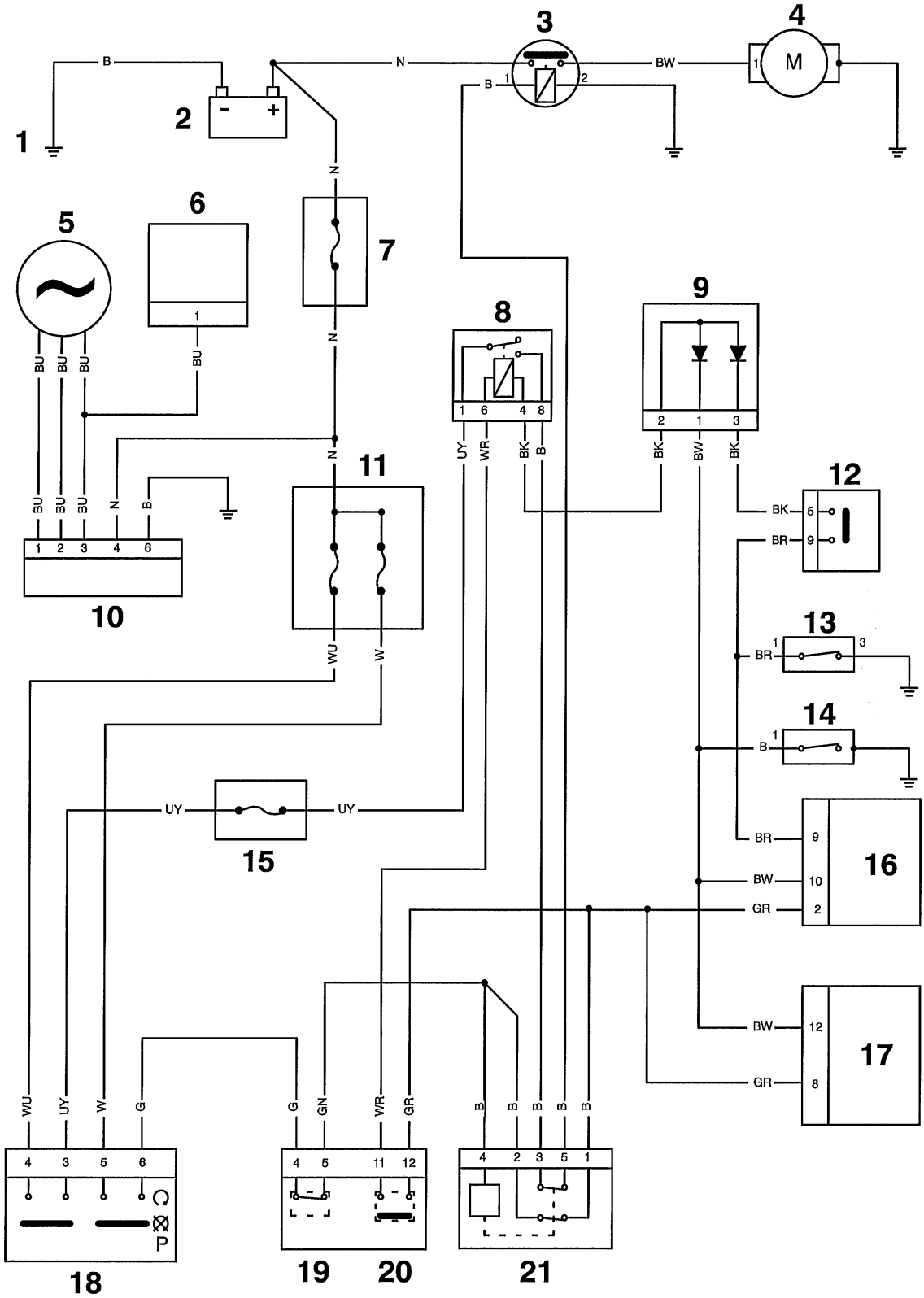


Key to starting/charging circuit diagram - Thruxton and Scrambler

Item number	Description
1	Engine earth
2	Battery
3	Starter solenoid
4	Starter motor
5	Alternator
6	Carburettor thermostat switch
7	Fuse 11
8	Starter relay
9	Diode pack
10	Rectifier regulator
11	Fuses 2 and 5
12	Clutch switch
13	Sidestand switch
14	Neutral switch
15	Fuse 9
16	Igniter
17	Instrument assembly
18	Ignition switch
19	Engine kill switch
20	Starter button
21	Alarm control unit

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Starting/Charging - Thruxton and Scrambler

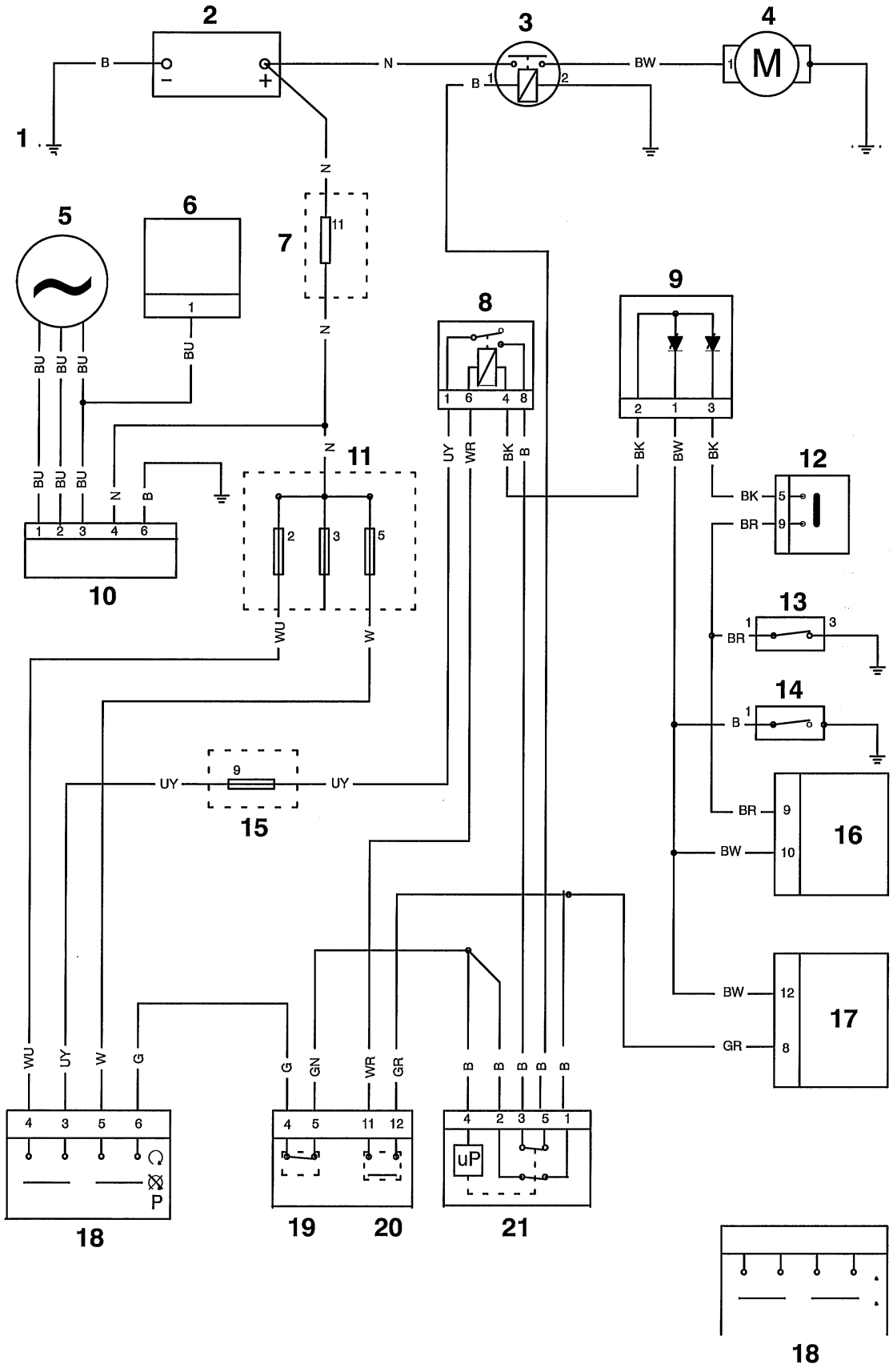


Key to starting/charging circuit diagram - Bonneville T100

Item number	Description
1	Engine earth
2	Battery
3	Starter solenoid
4	Starter motor
5	Alternator
6	Carburettor thermostat switch
7	Fuse 11
8	Starter relay
9	Diode pack
10	Rectifier regulator
11	Fuses 2, 3 and 5
12	Clutch switch
13	Sidestand switch
14	Neutral switch
15	Fuse 9
16	Igniter
17	Instrument assembly
18	Ignition switch
19	Engine kill switch
20	Starter button
21	Alarm control unit

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Starting/Charging - Bonneville T100

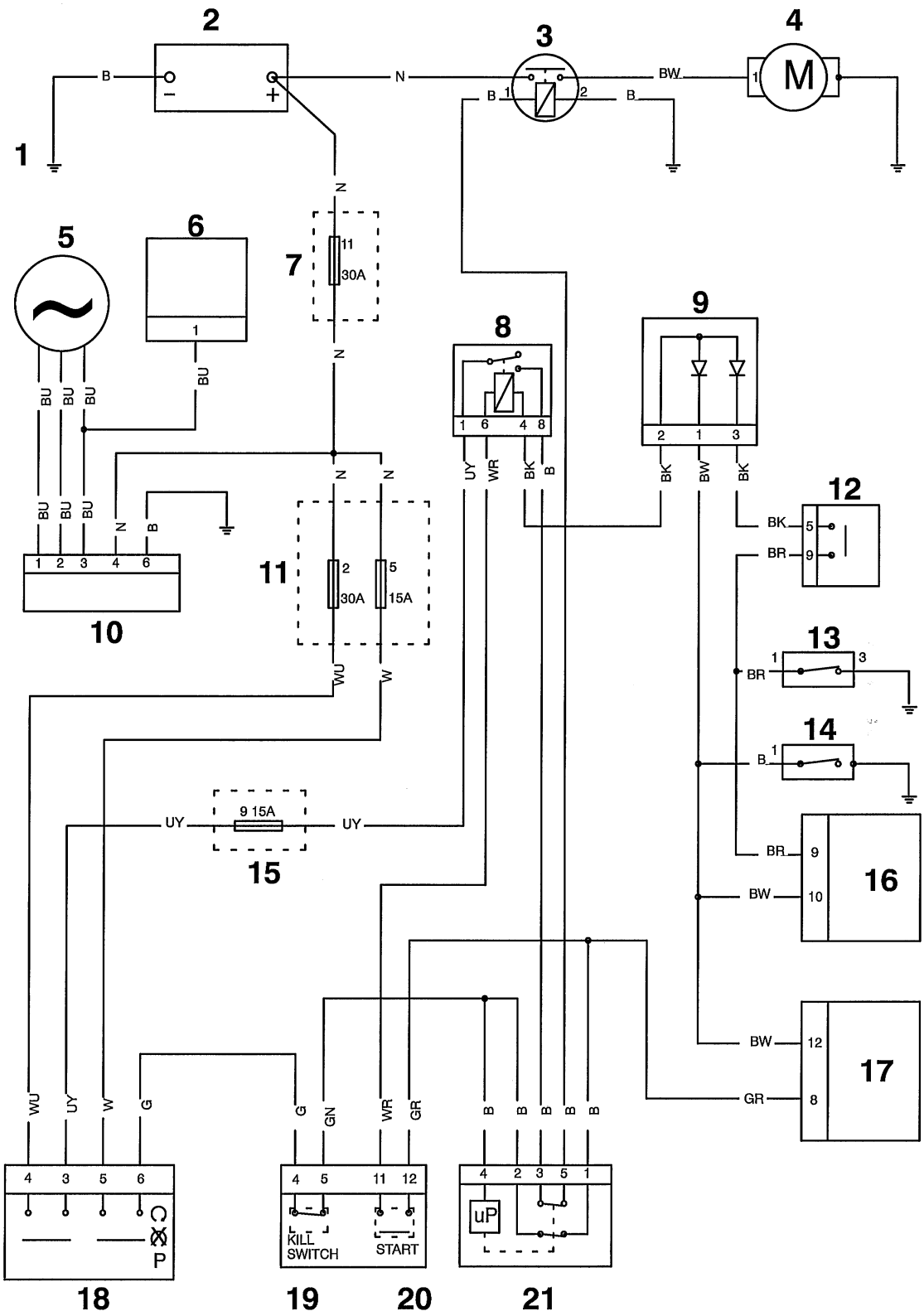


Key to starting/charging circuit diagram - America & Speedmaster

Item number	Description
1	Engine earth
2	Battery
3	Starter solenoid
4	Starter motor
5	Alternator
6	Carburettor thermostat switch
7	Fuse 11
8	Starter relay
9	Diode pack
10	Rectifier regulator
11	Fuses 2 and 5
12	Clutch switch
13	Sidestand switch
14	Neutral switch
15	Fuse 9
16	Igniter
17	Instrument assembly
18	Ignition switch
19	Engine kill switch
20	Starter button
21	Alarm control unit

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

Starting/Charging - America & Speedmaster

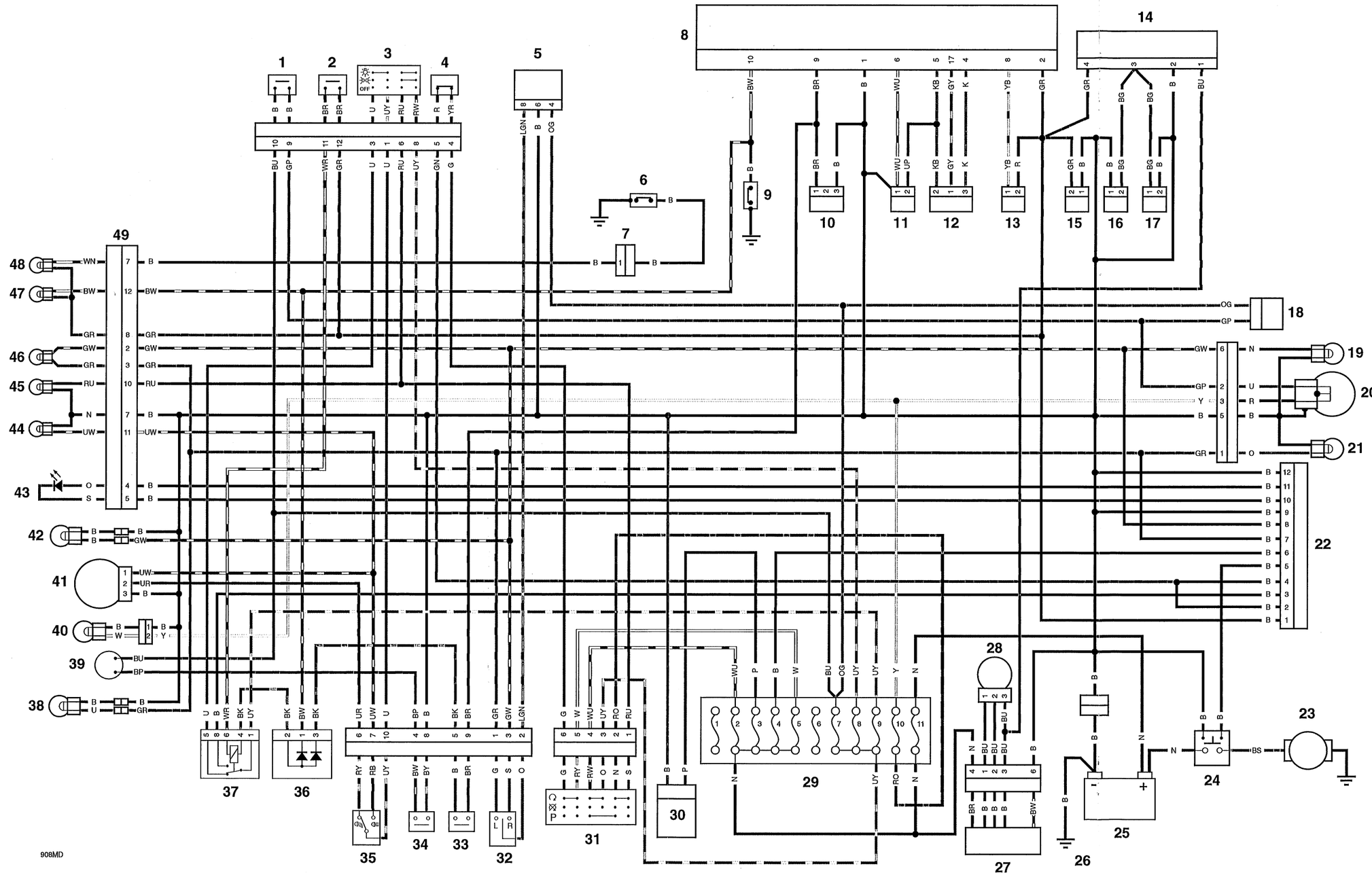


Key to main circuit diagram - Bonneville

Item Number	Description
1	Front brake lever switch
2	Starter button
3	Main lighting switch
4	Engine kill switch
5	Flasher unit
6	Oil pressure switch
7	Oil pressure switch sub-harness
8	Igniter
9	Neutral switch
10	Sidestand switch
11	Crankshaft sensor
12	Throttle position sensor
13	Ignition coil
14	Carburettor heater thermostat switch
15	Carburettor vent valve
16	Carburettor heater 1
17	Carburettor heater 2
18	Rear brake pedal switch
19	Right hand rear indicator
20	Rear light
21	Left hand rear indicator
22	Alarm connector
23	Starter motor
24	Starter solenoid
25	Battery
26	Engine earth
27	Rectifier regulator
28	Alternator
29	Fusebox
30	Accessory socket
31	Ignition switch
32	Direction indicator switch
33	Clutch switch
34	Horn button
35	Headlight dip switch

Item Number	Description
36	Diode pack
37	Starter switch
38	Left hand front indicator
39	Horn
40	Front position light
41	Headlight
42	Right hand front indicator
43	Alarm LED
44	Main beam warning light
45	Speedometer illumination
46	Indicator warning light
47	Neutral light
48	Low oil pressure warning light
49	Instrument connector

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

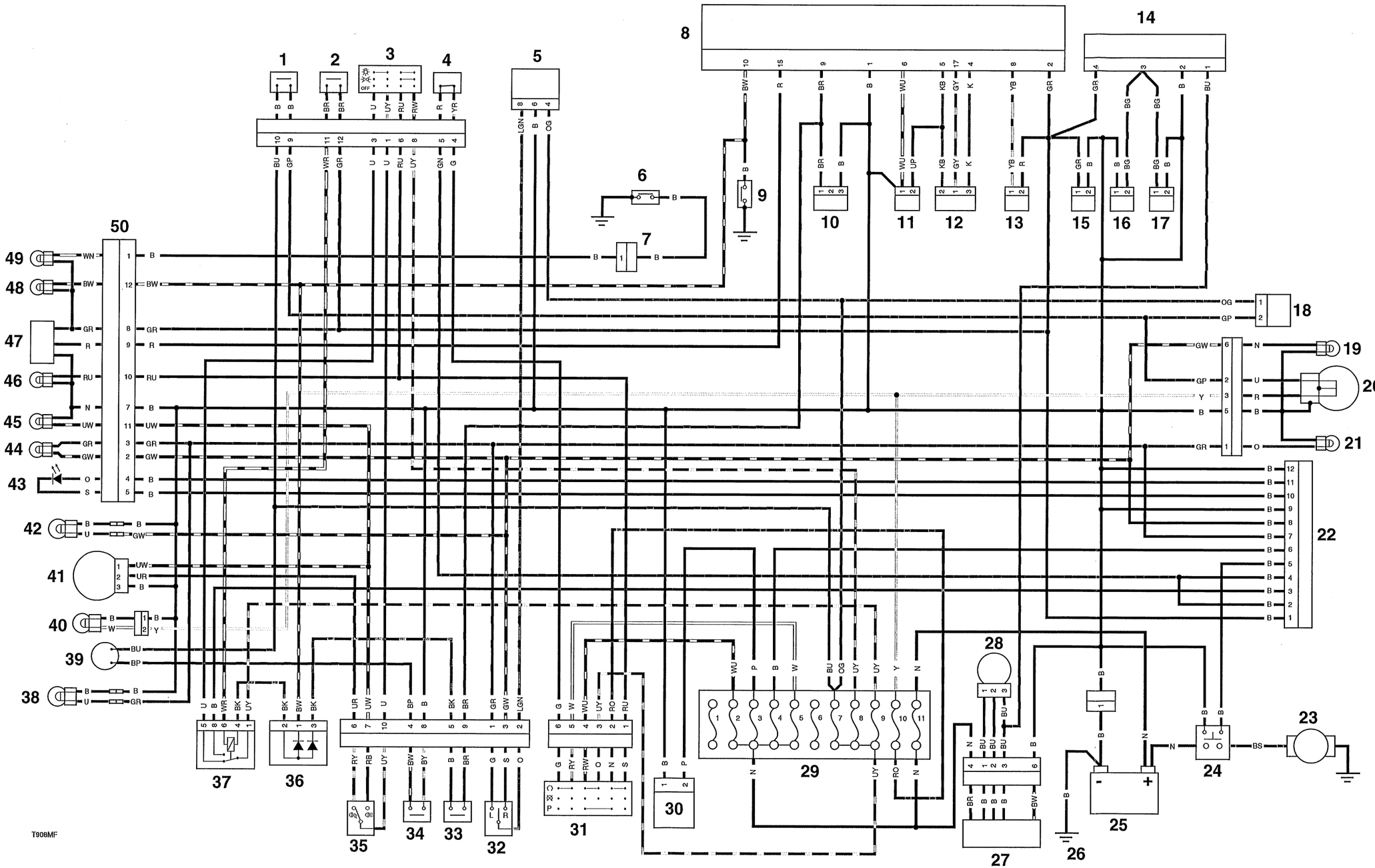

908MD

Key to main circuit diagram - Bonneville T100

Item Number	Description
1	Front brake lever switch
2	Starter button
3	Main lighting switch
4	Engine kill switch
5	Flasher unit
6	Oil pressure switch
7	Oil pressure switch sub-harness
8	Igniter
9	Neutral switch
10	Sidestand switch
11	Crankshaft sensor
12	Throttle position sensor
13	Ignition coil
14	Carburettor heater thermostat switch
15	Carburettor vent valve
16	Carburettor heater 1
17	Carburettor heater 2
18	Rear brake pedal switch
19	Right hand rear indicator
20	Rear light
21	Left hand rear indicator
22	Alarm connector
23	Starter motor
24	Starter solenoid
25	Battery
26	Engine earth
27	Rectifier regulator
28	Alternator
29	Fusebox
30	Accessory socket
31	Ignition switch
32	Direction indicator switch
33	Clutch switch
34	Horn button
35	Headlight dip switch

Item Number	Description
36	Diode pack
37	Starter switch
38	Left hand front indicator
39	Horn
40	Front position light
41	Headlight
42	Right hand front indicator
43	Alarm LED
44	Indicator warning light
45	Main beam warning light
46	Instrument illumination
47	Tachometer
48	Neutral light
49	Low oil pressure warning light
50	Instrument connector

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

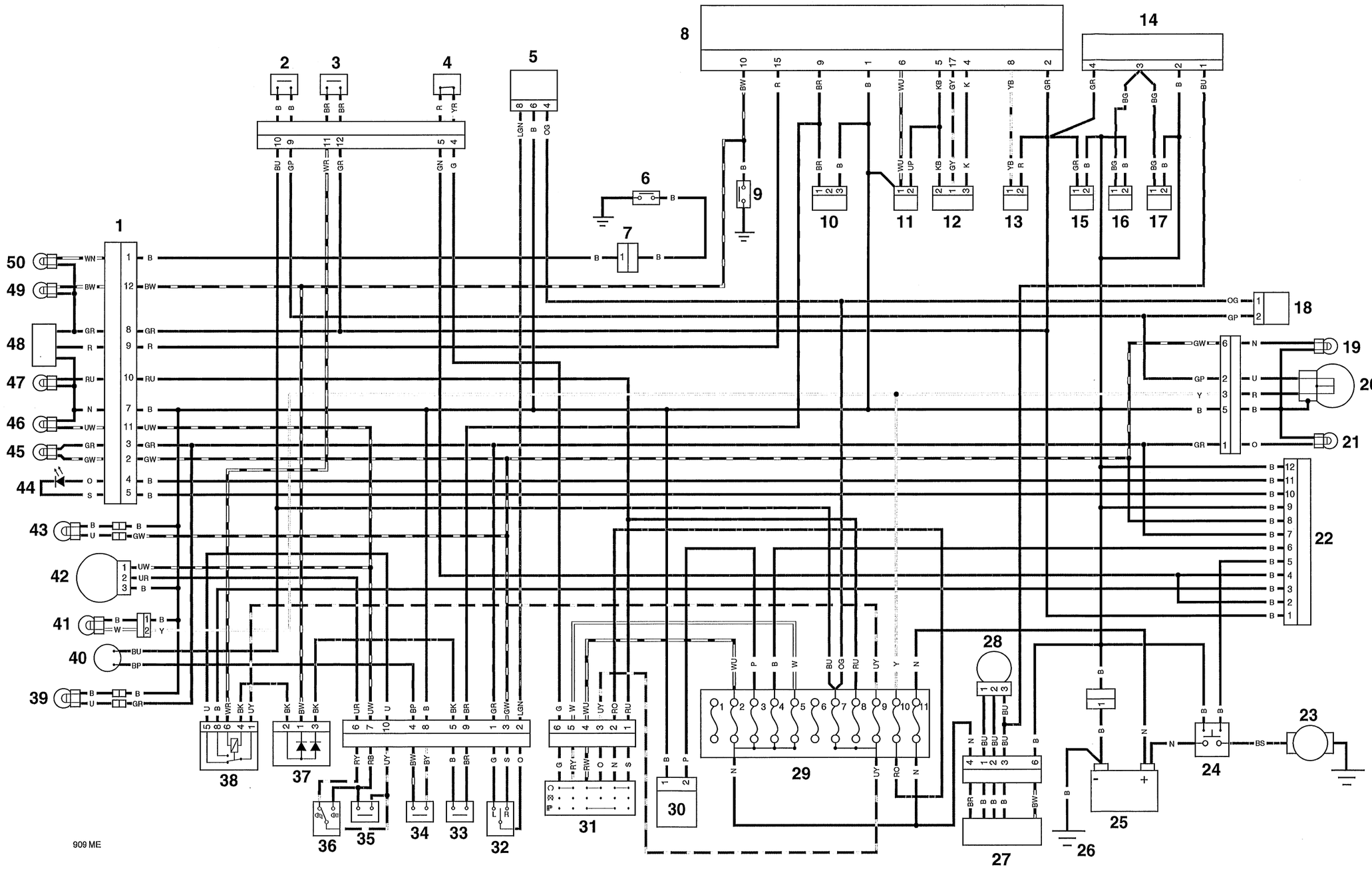

T908MF

Key to main circuit diagram - Thruxton

Item Number	Description
1	Instrument assembly
2	Front brake lever switch
3	Starter button
4	Engine kill switch
5	Direction Indicator Control Unit
6	Oil pressure switch
7	Oil pressure switch sub-harness
8	Igniter
9	Neutral switch
10	Sidestand switch
11	Crankshaft position sensor
12	Throttle position sensor
13	Ignition coil
14	Carburettor heater thermostat switch
15	Carburettor vent valve
16	Carburettor heater 1
17	Carburettor heater 2
18	Rear brake pedal switch
19	Right hand rear indicator
20	Rear light
21	Left hand rear indicator
22	Alarm connector
23	Starter motor
24	Starter solenoid
25	Battery
26	Engine earth
27	Rectifier regulator
28	Alternator
29	Fusebox
30	Accessory socket
31	Ignition switch
32	Direction indicator switch
33	Clutch switch
34	Horn button
35	Pass switch

Item Number	Description
36	Headlight dip switch
37	Diode pack
38	Starter relay
39	Left hand front indicator
40	Horn
41	Front position light
42	Headlight
43	Right hand front indicator
44	Alarm LED
45	Indicator warning light
46	Main beam warning light
47	Instrument illumination
48	Tachometer
49	Neutral light
50	Low oil pressure warning light

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

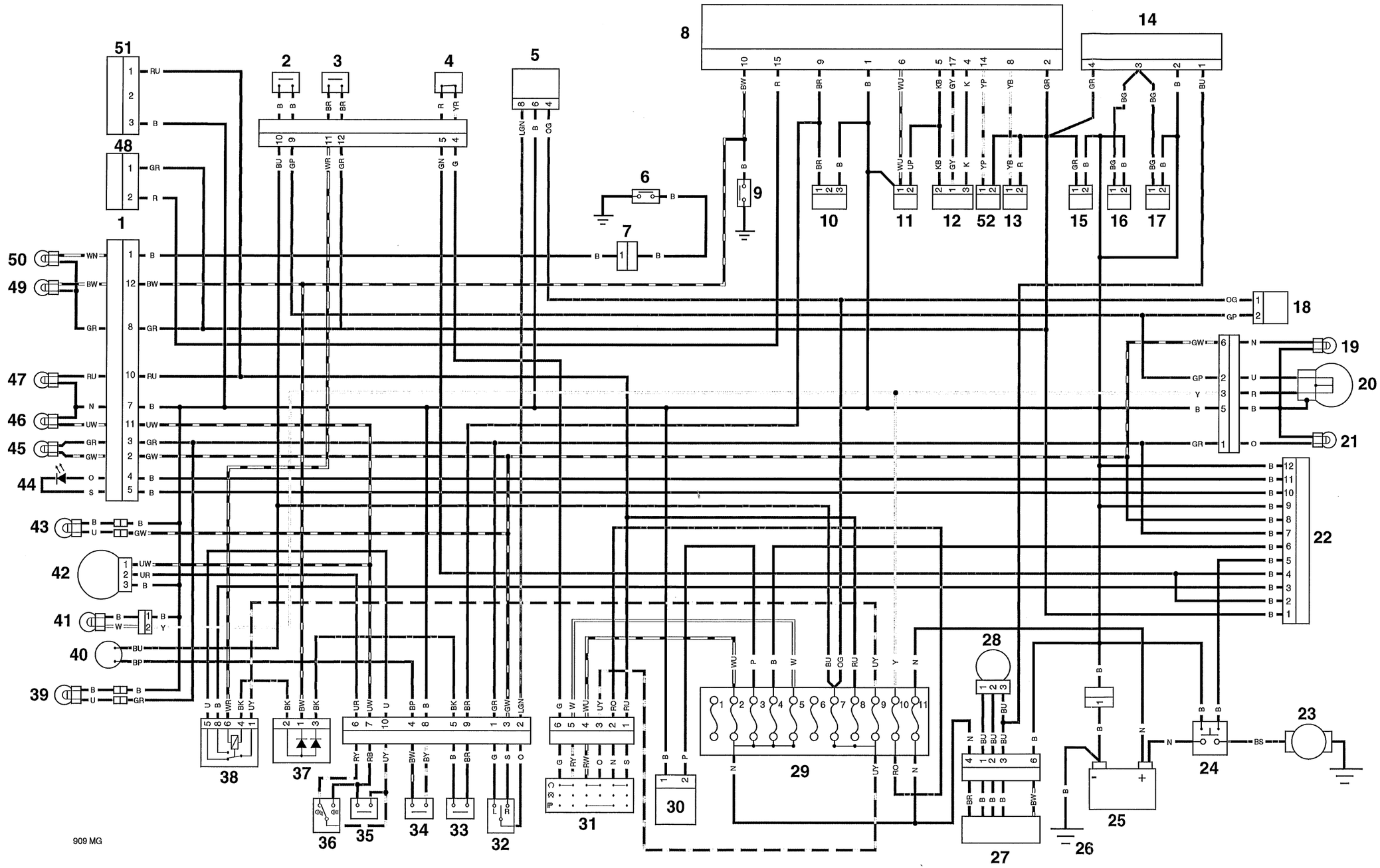

909 ME

Key to main circuit diagram - Scrambler

Item Number	Description
1	Instrument assembly
2	Front brake lever switch
3	Starter button
4	Engine kill switch
5	Direction Indicator Control Unit
6	Oil pressure switch
7	Oil pressure switch sub-harness
8	Igniter
9	Neutral switch
10	Sidestand switch
11	Crankshaft position sensor
12	Throttle position sensor
13	Ignition coil #1
14	Carburettor heater thermostat switch
15	Carburettor vent valve
16	Carburettor heater 1
17	Carburettor heater 2
18	Rear brake pedal switch
19	Right hand rear indicator
20	Rear light
21	Left hand rear indicator
22	Alarm connector
23	Starter motor
24	Starter solenoid
25	Battery
26	Engine earth
27	Rectifier regulator
28	Alternator
29	Fusebox
30	Accessory socket
31	Ignition switch
32	Direction indicator switch
33	Clutch switch
34	Horn button
35	Pass switch

Item Number	Description
36	Headlight dip switch
37	Diode pack
38	Starter relay
39	Left hand front indicator
40	Horn
41	Front position light
42	Headlight
43	Right hand front indicator
44	Alarm LED
45	Indicator warning light
46	Main beam warning light
47	Instrument illumination
48	Accessory Tacho A
49	Neutral light
50	Low oil pressure warning light
51	Accessory Tacho B
52	Ignition coil #2

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue

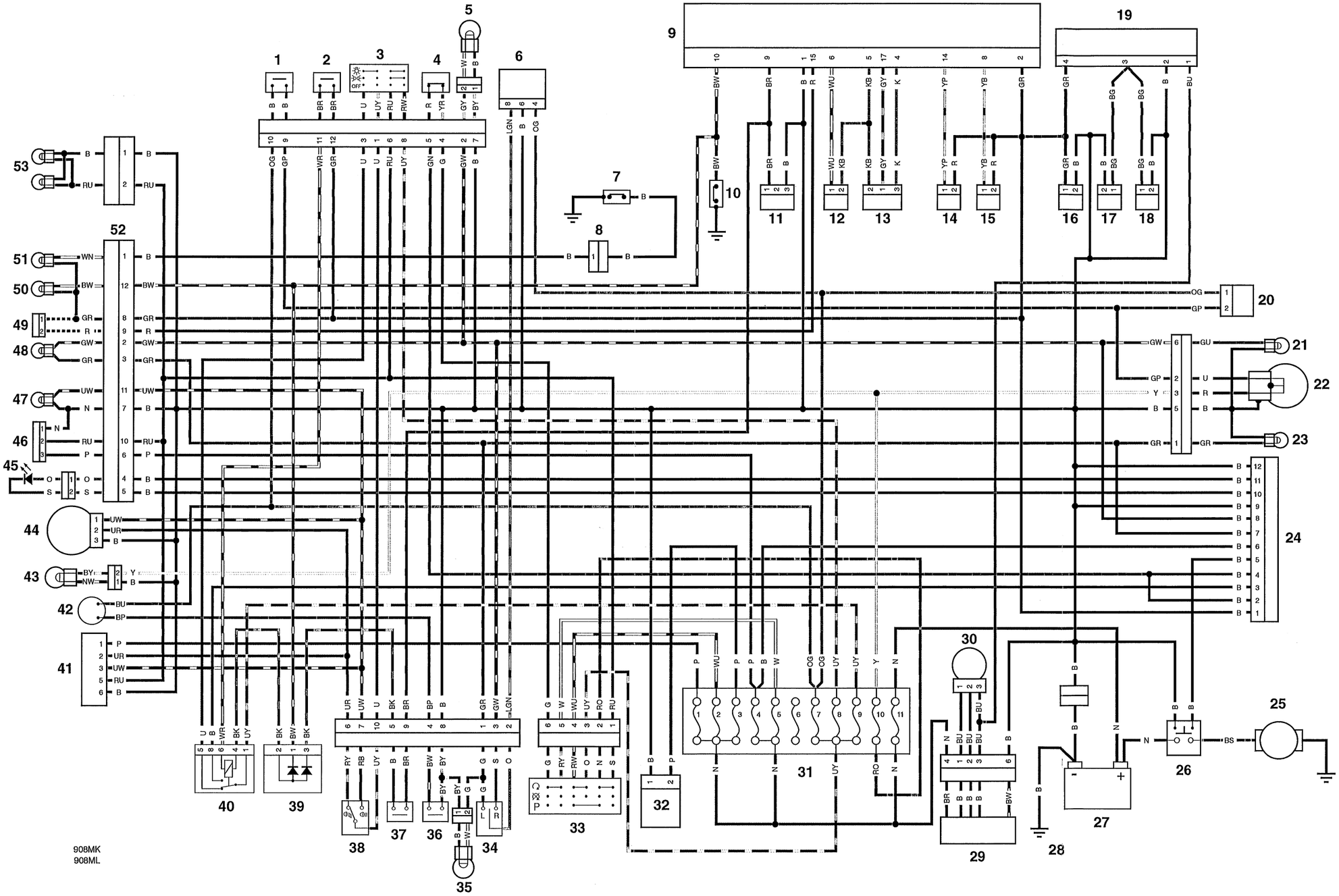

909 MG

Key to main circuit diagram - America & Speedmaster

Item Number	Description
1	Front brake lever switch
2	Starter button
3	Main lighting switch
4	Engine kill switch
5	Right hand front turn signal light
6	Turn signal unit
7	Oil pressure switch
8	Oil pressure switch harness
9	Igniter
10	Neutral switch
11	Sidestand switch
12	Crankshaft position sensor
13	Throttle position sensor
14	Ignition coil 1
15	Ignition coil 2
16	Carburettor vent valves
17	Carburettor heater 1
18	Carburettor heater 2
19	Carburettor thermostat switch
20	Rear brake pedal switch
21	Right hand rear turn signal light
22	Rear light
23	Left hand rear turn signal light
24	Alarm connector
25	Starter motor
26	Starter solenoid
27	Battery
28	Engine earth
29	Rectifier/regulator
30	Generator
31	Fuses
32	Accessory socket
33	Ignition switch
34	Turn signal switch
35	Left hand front turn signal light

Item Number	Description
36	Clutch switch
37	Horn button
38	Headlight dip-switch
39	Diode pack
40	Starter relay
41	Accessory light connector
42	Horn
43	Front position light
44	Headlight
45	Alarm LED (accessory)
46	Clock connector
47	Main beam warning light
48	Turn signal warning light
49	Tachometer connection (where used)
50	Neutral warning light
51	Oil pressure warning light
52	Instrument connector
53	Speedometer illumination

Wire colour codes	
B	Black
U	Blue
N	Brown
G	Green
S	Slate grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light green
LU	Light blue


908MK
908ML