

America, America LT & Speedmaster 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, an authorised Triumph dealer must undertake all adjustments, maintenance, and repair work.

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, an authorised Triumph dealer must perform all repairs and scheduled maintenance.

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 Electronic Parts Catalogue (EPC).
- 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.

Warnings, Cautions and Notes

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 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 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 Procedures

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.

Introduction

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1 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!

Third Party Products



Warning

Many proprietary products, such as chemicals, solvents and cleaning agents, will cause damage to components if used incorrectly or inappropriately. Always follow the manufacturer's instructions printed on the product container's labels and obey the instructions given. These instructions are included for your safety and well-being.

Damage to the motorcycle components caused by the incorrect or inappropriate use of chemicals, solvents and cleaning agents may reduce the components efficiency, resulting in loss of motorcycle control and an accident.

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.

Oils



Warning

The engine 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.

General Information

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 your 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 that 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 as listed in the general information section of this manual. The use of brake fluids other than those DOT 4 fluids listed in the general information section 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.



Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to loss of motorcycle control and an accident could result if this warning is ignored.

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 during lifting or jacking or while repairs and servicing are carried out.

Never rely on a single means of support when working with the motorcycle. Use additional safety supports and straps to prevent toppling.

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

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

General Information

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, except in those recommended cases when this forms part of an adjustment.

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 appropriate 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 or grease 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 any indoor environment 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, CO₂, 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, 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.

General Information



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.

Electrical Testing

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 12 V is connected to a bulb of 60 W:

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

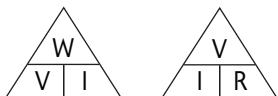
$$\frac{W}{V} = I \quad \frac{60}{12} = 5$$

- the bulb resistance can be calculated by using -

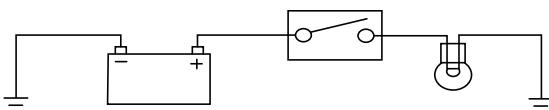
$$\frac{V}{I} = R \quad \frac{12}{5} = 2.4$$

General Information

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



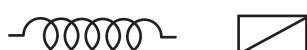
This illustration is used to show all multi-plug type electrical connectors on Triumph circuit diagrams. The numbers in the box relate to the terminal numbers of the connector pins. On ECUs with two connectors, the number would be prefixed with the letters 'A' or 'B' to identify each connector. An additional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

Diode



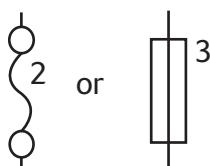
An electrical one-way valve. Diodes allow current to flow in one direction but will not allow it to return. The arrow, which forms part of the diode symbol, indicates the direction of current flow.

Electromagnetic Winding (solenoid)



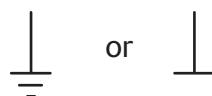
An electromagnetic winding (or solenoid) is used to convert an electrical current into a lateral movement. This can then be used to operate switches (as used in relays) or other components such as fuel injectors or secondary air injection solenoids.

Fuse



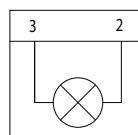
A fuse is a device which protects a circuit in the event of a fault. The fuse will 'blow' should a short circuit occur, protecting that circuit from further damage. The number next to the fuse on the circuit diagram indicates the position of the fuse in the fusebox.

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



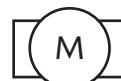
This symbol is used to show all types of light bulbs. The numbers in the box relate to the terminal numbers of the connector pins. An additional number outside the box will identify the component.

LED (Light Emitting Diode)



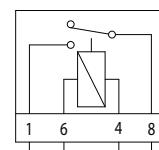
Triumph use LEDs for the alarm warning light, instrument illumination and warning lights, gear change lights and rear light/brake lights on various models.

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.

General Information

If a mechanical switch were used, the mechanical switch contacts would quickly burn away.

Resistor



A device placed in a cable to reduce a voltage or restrict the maximum current a device can draw.

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

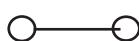
Normally Open



or



Normally Closed



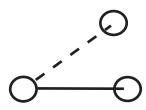
or



Change Over



or

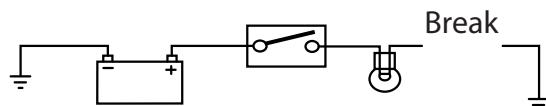


A mechanical device for completing or breaking a circuit. There are three common types of switch: Normally open, normally closed and change-over.

Tracing Circuits

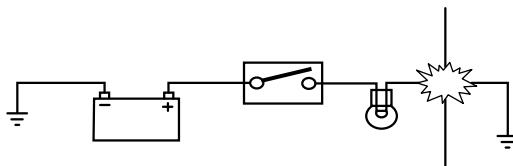
The following is a description of two types of common electrical failures, and some of the methods which may be used to find them.

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 be 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.

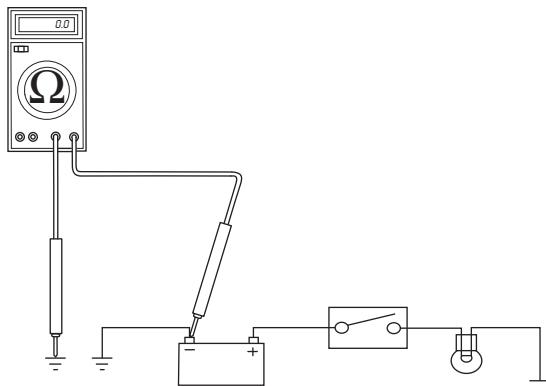
To Check Continuity:



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.

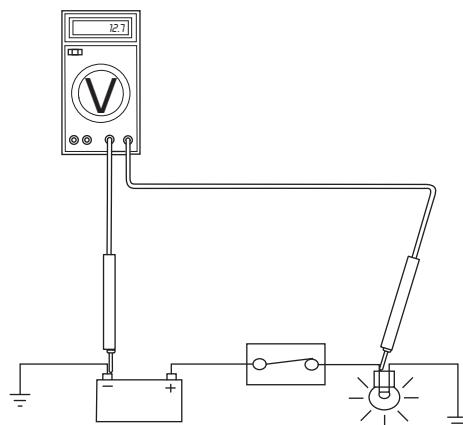


Continuity (Resistance) Check

- 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 beep 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 beep 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.



Voltage Check

- 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.

General Information

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.

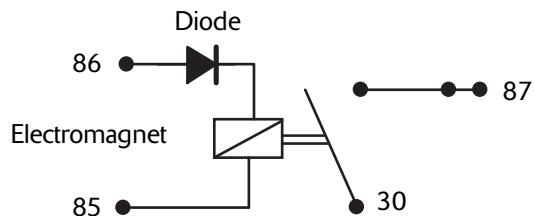
To locate a splice, it is necessary to peel back the insulation and examine the splice for its integrity. The most common fault is where one of the wires at the joint has come adrift usually causing the circuit it feeds or earths to become 'dead'.

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 beep.

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.

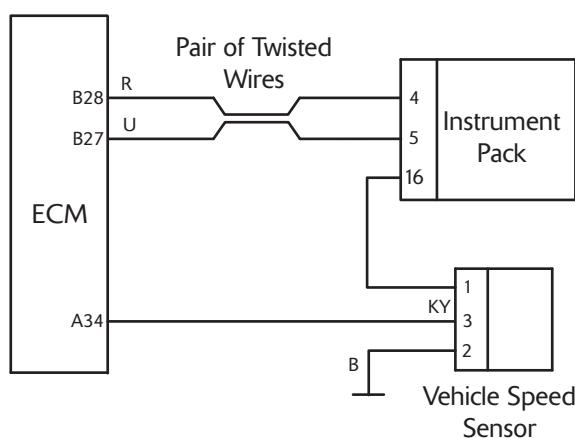
CAN (Controller Area Networking)

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.

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.



**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).

General Information

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

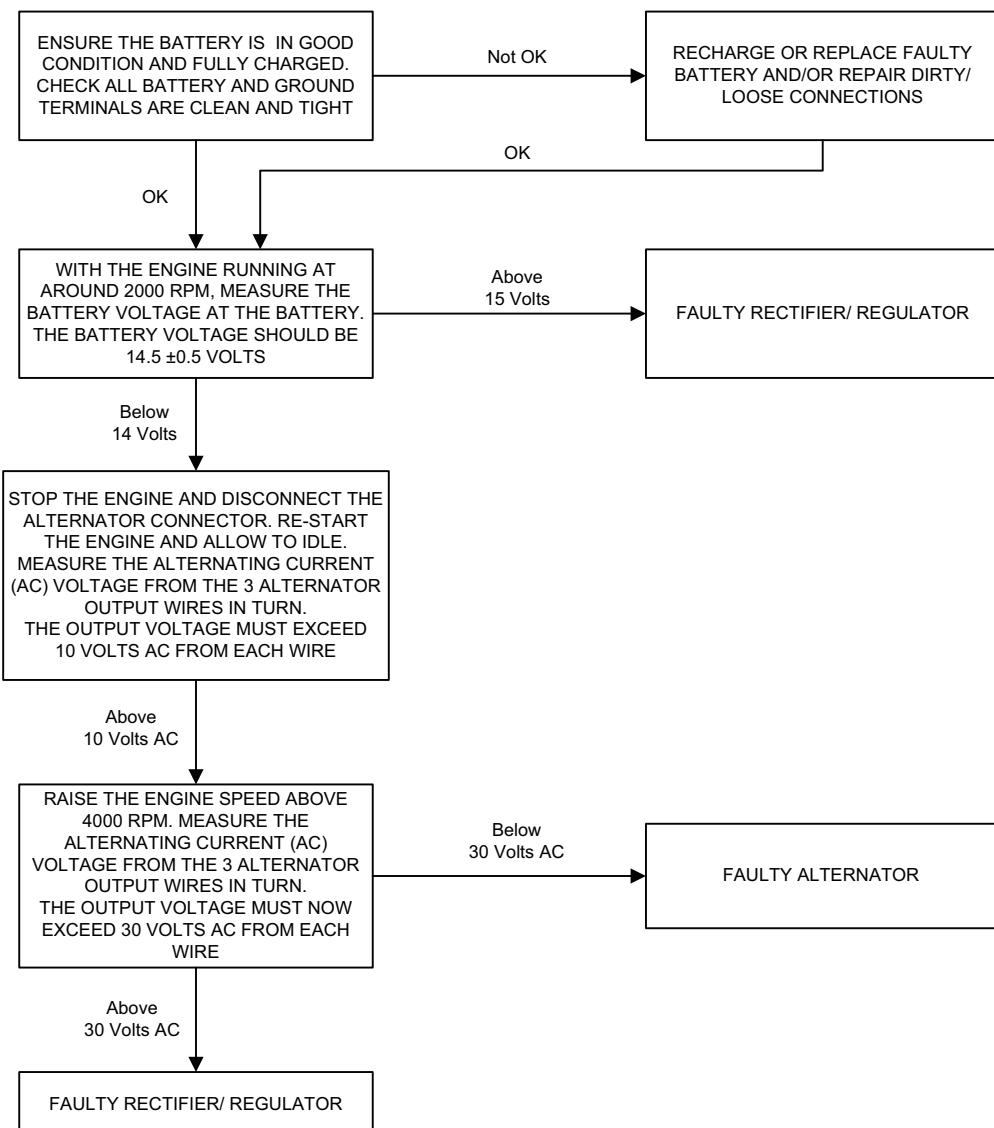
done by the rectifier/regulator, which uses diodes to convert the alternator output to DC volts and limit the resulting output to the correct figure required for optimal battery charging.

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 (See page 17-19).

Rectify any defects as necessary.

Diagnosis - Charging Circuit



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.

Note:

- **On all new models from Daytona 675 onwards, which use a CAN connection between the instruments and the ECM, the engine will not crank if the instruments are disconnected.**

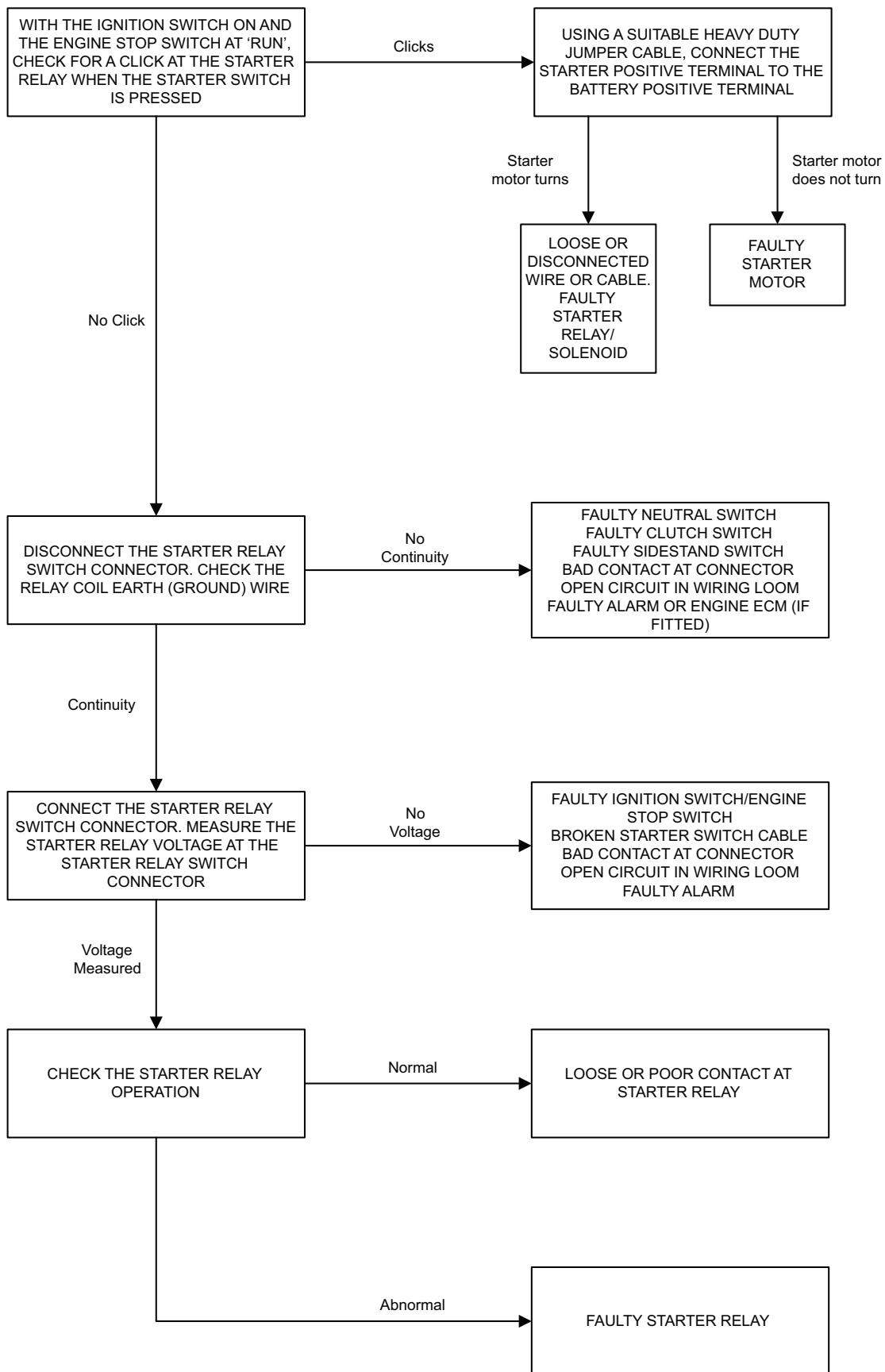
Rectify any defects as necessary.

General Fault Finding - Starter Motor and Relay

Symptom	Possible cause(s)
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 not 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

General Information

Diagnosis - Starter Circuit



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 genuine parts should be used to service, repair or convert Triumph motorcycles. To ensure that Triumph genuine 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 genuine 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.

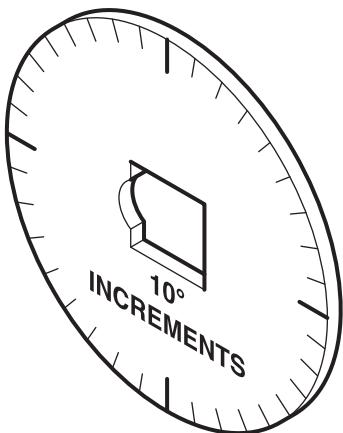
General Information

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.

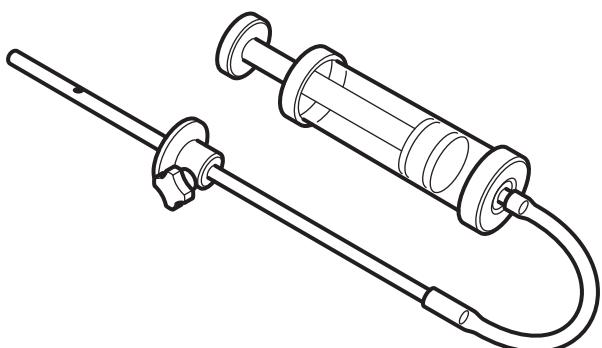
Special service tools:

T3880105 - Angular Torque Gauge



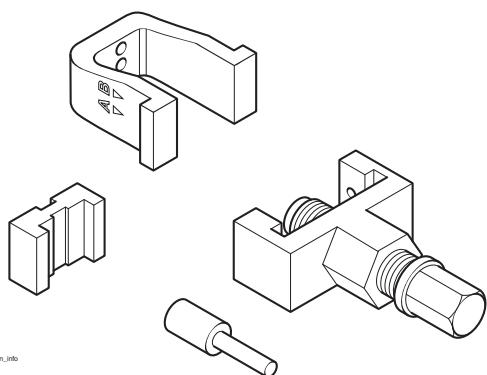
cbxt

T3880160 - Fork Filler/Evacuator



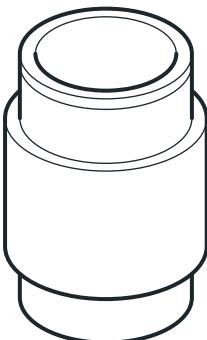
ccha

A9938017 - Chain Link Tool Kit



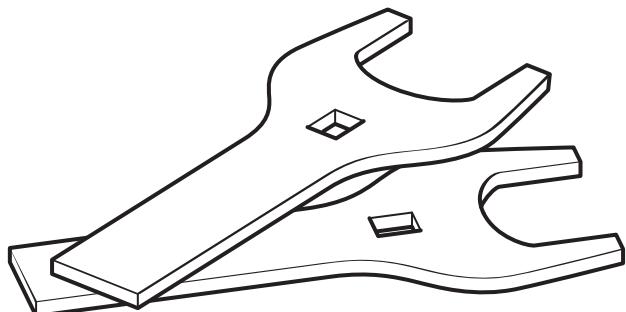
camr_gen_info

388080-T0301 - Fork Seal/Bearing Drift



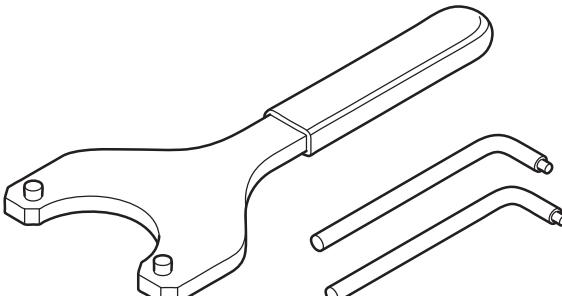
ccgv

T3880140 - Head Race Adjusters

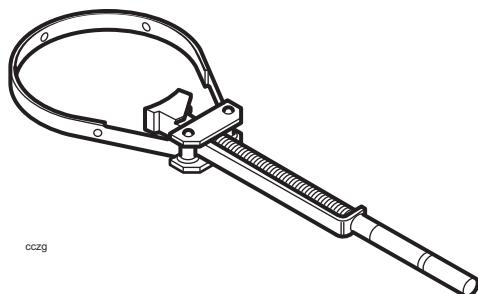


kagf

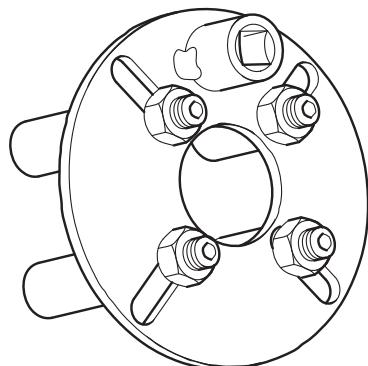
T3880330 - Camshaft Backlash Gear Locking Pins and Wrench



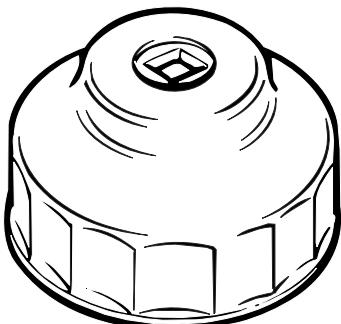
T3880375 - Alternator Rotor Holder



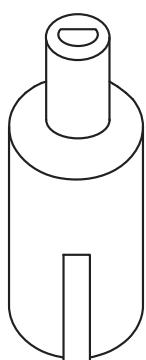
T3880360 Clutch Holding Tool



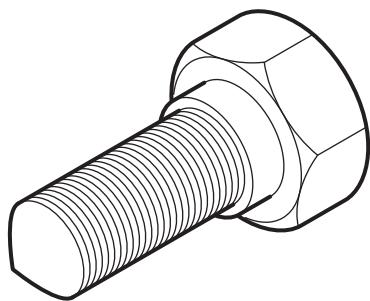
T3880313 - Oil Filter Wrench



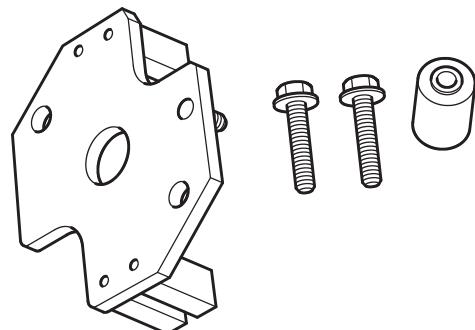
T3880107 - Adaptor, Carburettors



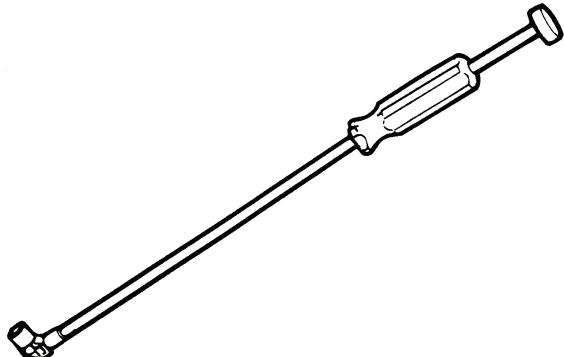
T3880203 - Puller, Alternator Rotor



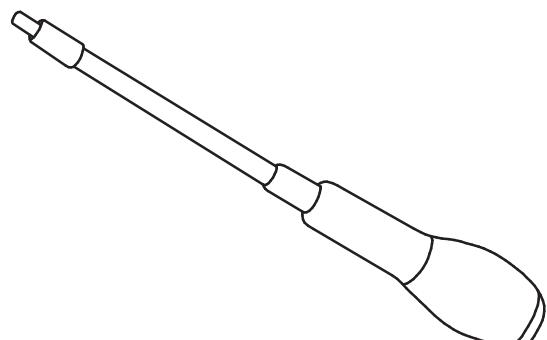
T3880014 - Clutch Alignment Jig



3880015-T0301 - Carburettor Adjustment Tool

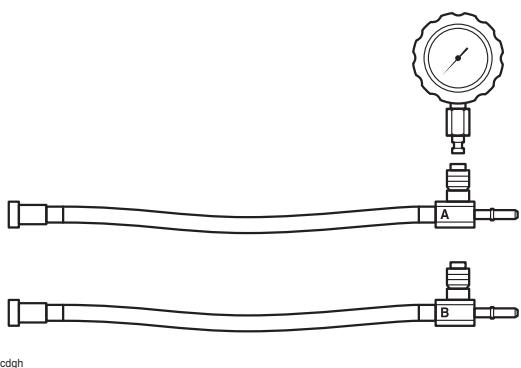


T3880089 - Idle Mixture Adjuster Tool - Carburettors



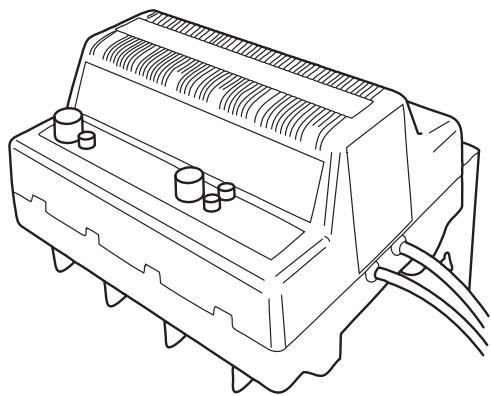
General Information

T3880001 - Fuel Pressure Gauge

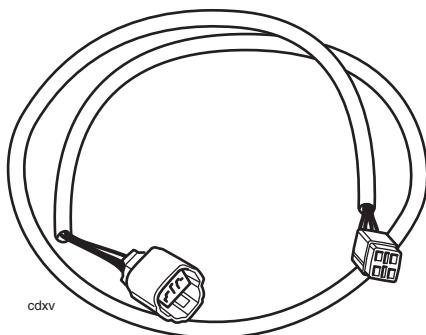


cdgh

BatteryMate Battery Charger - see Latest Parts Catalogue for Part Number Information

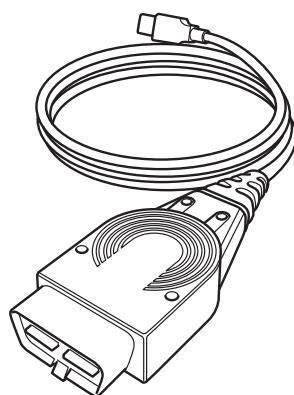


T3880124 - Extension cable



cdxv

T3880057 - Triumph diagnostic tool



General Information

Full Specification		790 cc America/Speedmaster with Carburetors	865 cc America/Speedmaster with Carburetors
Engine		Twin Cylinder 8 Valve DOHC	Twin Cylinder 8 Valve DOHC
Arrangement		Transverse In-line	Transverse In-line
Displacement		790 cc	865 cc
Bore x Stroke		86 mm x 68 mm	90 mm x 68 mm
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°	270°
Max. Power (DIN 70020)		62 PS @ 7,400 RPM	55 PS @ 6,500 RPM
Max. Torque		60 Nm @ 3,500 RPM	68 Nm @ 3,500 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 mm to 5.478 mm (std)	5.463 mm to 5.478 mm (std)
Service limit		5.453 mm	5.453 mm
	Ex.	5.451 mm to 5.466 mm (std)	5.451 mm to 5.466 mm (std)
Service limit		5.441 mm	5.441 mm
Valve Guide Bore Dia.		5.500 mm to 5.515 mm (std)	5.500 mm to 5.515 mm (std)
Service limit		5.543 mm	5.543 mm
Valve Seat Width (in head)		0.9 mm to 1.1 mm (std)	0.9 mm to 1.1 mm (std)
Service limit		1.5 mm	1.5 mm
Valve Seat Width (valve)		1.27 mm - 1.56 mm (std)	1.27 mm - 1.56 mm (std)
Service limit		1.56 mm	1.56 mm
Valve Seat Angle		45°	45°
Valve Spring Free Length		42.4 mm (std)	42.4 mm (std)
Service limit		41.7 mm	41.7 mm
Valve Clearance	In.	0.15 mm to 0.20 mm	0.15 mm to 0.20 mm
	Ex.	0.25 mm to 0.30 mm	0.25 mm to 0.30 mm
Tappet Bucket Bore Dia.		28.015 mm to 28.035 mm (std)	28.015 mm to 28.035 mm (std)
Service limit		28.050 mm	28.050 mm
Tappet Bucket Dia.		27.978 mm to 27.993 mm (std)	27.978 mm to 27.993 mm (std)
Service limit		27.970 mm	27.970 mm

General Information

Full Specification

790 cc America/Speedmaster with Carburetors

865 cc America/Speedmaster with Carburetors

Cylinder Head (continued)

Valve Timing	Inlet	Open 22° BTDC (@ 1.0 mm Lift)	Open 4° BTDC (@ 1.0 mm Lift)
		Close 46° ABDC (@ 1.0 mm Lift)	Close 28° ABDC (@ 1.0 mm Lift)
		Duration 248°	Duration 212°
	Exhaust	Open 42° 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 228°	Duration 212°
Camshaft Journal Dia.		22.930 mm to 22.960 mm (std)	22.930 mm to 22.960 mm (std)
Camshaft Journal Clearance		0.03 mm to 0.07 mm (std)	0.03 mm to 0.07 mm (std)
Service limit		0.12 mm	0.12 mm
Camshaft Journal Bore Dia.		23.000 mm to 23.021 mm	23.000 mm 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

Barrels and Pistons

Cylinder Bore Dia.		85.991 mm to 86.009 mm (std)	89.991 mm to 90.009 mm (std)
Service limit		86.034 mm	90.034 mm
Piston Diameter - standard		85.975 mm to 85.990 mm	89.972 mm to 89.989 mm
Piston Diameter - service limit		85.935 mm	89.933 mm
Piston Ring to Groove Clearance		0.02 mm to 0.06 mm (std)	0.02 mm to 0.06 mm (std)
Service limit		0.075 mm	0.075 mm
Piston Ring Groove Width	Top	1.01 mm to 1.03 mm	1.01 mm to 1.03 mm
	Second	1.01 mm to 1.03 mm	1.01 mm to 1.03 mm
	Oil	2.01 mm to 2.03 mm	2.01 mm 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 mm to 19.008 mm (std)	19.002 mm to 19.008 mm (std)
Service limit		19.036 mm	19.030 mm
Gudgeon Pin Dia.		18.995 to 19.000 mm (std)	18.995 mm to 19.000 mm (std)
Service limit		18.985 mm	18.990 mm

Primary Drive

Primary Drive	Type	Gear	Gear
Reduction Ratio		1.74:1 (62/108)	1.74:1 (62/108)

General Information

Full Specification

790 cc America/Speedmaster with Carburettors

865 cc America/Speedmaster with Carburettors

Clutch

Steel Plate Warpage Limit	Less than 0.15 mm	Less than 0.15 mm
Friction Plate Thickness	3.22 mm to 3.38 mm (std)	3.22 mm to 3.38 mm (std)
Service limit	3.1 mm	3.1 mm
Clutch Actuation Method	Cable	Cable
Cable Free Play (at lever)	2 mm to 3 mm	2 mm to 3 mm

Crankshaft/Connecting Rod

Big End Journal Dia	40.946 mm to 40.960 mm (std)	40.946 mm to 40.960 mm (std)
Service limit	40.932 mm	40.932 mm
Big End Bearing Clearance	0.036 mm to 0.066 mm (std)	0.036 mm to 0.066 mm (std)
Service limit	0.1 mm	0.1 mm
Main Bearing Journal Dia	37.960 mm to 37.976 mm (std)	37.960 mm to 37.976 mm (std)
Service limit	37.936 mm	37.936 mm
Main Bearing Clearance	0.019 mm to 0.044 mm (std)	0.019 mm to 0.044 mm (std)
Service limit	0.1 mm	0.1 mm
Crankshaft Endfloat	0.05 mm to 0.20 mm (std)	0.05 mm to 0.20 mm (std)
Service limit	0.40 mm	0.40 mm
Connecting Rod Small End Dia.	19.016 mm to 19.034 mm (std)	19.016 mm to 19.034 mm (std)
Service limit	19.040 mm	19.040 mm
Connecting Rod Big End Side Clearance	0.15 mm to 0.30 mm (std)	0.15 mm to 0.30 mm (std)
Service limit	0.50 mm	0.50 mm

General Information

Full Specification

**790 cc America/Speedmaster
with Carburetors**

**865 cc America/Speedmaster
with Carburetors**

Transmission

Type	5 Speed Constant Mesh	5 Speed Constant Mesh
Gear Ratios	1st	2.73:1 (41/15)
	2nd	1.95:1 (37/19)
	3rd	1.55:1 (34/22)
	4th	1.29:1 (31/24)
	5th	1.07:1 (29/27)
Gear Selector Fork Thickness	5.8 mm to 5.9 mm (service limit 5.7 mm)	5.8 mm to 5.9 mm (service limit 5.7 mm)
Gear Selector Groove Width	6.0 mm to 6.1 mm (service limit 6.2 mm)	6.0 mm to 6.1 mm (service limit 6.2 mm)
Final Drive	Chain	Chain
Final Drive Ratio		
America	2.47:1 (17/42)	Up to VIN 282963 - Factory 2 or VIN 273654 - Factory 4 2.47:1 (17/42)
		From VIN 282964 - Factory 2 or VIN 273655 - Factory 4 2.333:1 (18:42)
Speedmaster	Up to VIN 179828 - 2.625:1 (16/42)	2.333:1 (18/42)
	From VIN 179829 - 2.333:1 (18/42)	
Chain Type	DID 525 VM2 (112 link)	DID 525 VM2 (112 link)
20 Link Length	Less than 321 mm	Less than 321 mm
Drive Chain Freeplay	35-45 mm	35-45 mm
Chain Lubrication	Chain spray suitable for O-ring chains	Chain spray suitable for O-ring chains

General Information

Full Specification

790 cc America/Speedmaster with Carburettors

865 cc America/Speedmaster with Carburettors

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 @ 4,000 rpm (@ 80°C Oil Temp)	40 psi @ 4,000 rpm (@ 80°C Oil Temp)
Oil Pump Rotor Tip Clearance	Less than 0.15 mm (std)	Less than 0.15 mm (std)
Service limit	0.20 mm	0.20 mm
Oil Pump Body Clearance	0.15 mm to 0.22 mm (std)	0.15 mm to 0.22 mm (std)
Service limit	0.35 mm	0.35 mm
Oil Pump Rotor End Float	0.02 mm to 0.07 mm (std)	0.02 mm to 0.07 mm (std)
Service limit	0.10 mm	0.10 mm

Ignition System

Type	Digital Inductive	Digital Inductive
Electronic Rev-Limiter	7,400 rpm	8,000 rpm
Pick Up Coil Air Gap	0.8 mm ±0.2 mm	0.8 mm ±0.2 mm
Spark Plug Type	NGK DPR8EA-9	NGK DPR8EA-9
Spark Plug Gap	0.8 mm to 0.9 mm	0.8 mm 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	16.6 Litres	16.6 Litres
Idle Speed	1,000 ±50 rpm	1,000 ±50 rpm
Idle Mixture Adjustment	See Section 9	See Section 9

Carburettors

Type	Keihin CVK 36	Keihin CVK 36
Main Jet	120	120
Pilot Jet	42	40
Starter Jet	52	55
Main Air Jet	80	100
Needle	NBAD	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

General Information

Full Specification

**790 cc America/Speedmaster
with Carburettors**

**865 cc America/Speedmaster
with Carburettors**

Suspension

Front Fork Travel	130 mm	130 mm
Recommended Fork Oil Grade	Kayaba G10	Kayaba G10
Oil Level (fork fully compressed)	161 mm below inner tube upper surface	161 mm below inner tube upper surface
Oil Volume (dry fill)	552 cc	552 cc
Rear Wheel Travel	96 mm	96 mm
Rear Suspension Bearing Grease	Grease to NLGI 2 specification	Grease to NLGI 2 specification

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	Up to VIN 169265 - 5.0 mm (service limit 4.5 mm)	5.5 mm (service limit 5.0 mm)
	From VIN 169266 - 5.5 mm (service limit 5.0 mm)	
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 5.0 mm)	6.0 mm (service limit 5.0 mm)
Rear Disc Dia	285 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	DOT 4	DOT 4

Wheels and Tyres

Spoked Wheel Rim Axial Run-out (America only)	1.0 mm	1.0 mm
Cast Wheel Rim Axial Run-out	0.6 mm	0.6 mm
Wheel Rim Radial Run-out	0.6 mm	0.6 mm
Tyres	See Owner's Handbook	See Owner's Handbook
Tyre Pressures	See section 15	See section 15
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 km/h)	2.0 mm (3.0 mm > 80 mph/130 km/h)



Warning

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

General Information

Full Specification

**790 cc America/Speedmaster
with Carburettors**

**865 cc America/Speedmaster
with Carburettors**

Frame

Overall Length	2,424 mm	2,424 mm
Overall Width	960 mm (America)	960 mm (America)
	830 mm (Speedmaster)	830 mm (Speedmaster)
Overall Height	1,170 mm (America)	1,170 mm (America)
	1,160 mm (Speedmaster)	1,160 mm (Speedmaster)
Wheelbase	1,655 mm	1,655 mm
Seat Height	720 mm	720 mm
Castor	33.3°	33.3°
Trail	153 mm	153 mm
Dry Weight	226 kg (America)	226 kg (America)
	229 kg (Speedmaster)	229 kg (Speedmaster)
Max. Payload (rider, passenger, luggage & accessories)	200 kg	200 kg

Electrical Equipment

Battery Type	Sealed	Sealed
Battery Rating	12 V-10 Ah	12 V-10 Ah
Alternator Rating	27 A	27 A
Fuses	See chapter 17	See chapter 17

General Information

Full Specification

865 cc America/America LT/Speedmaster with Electronic Fuel Injection (EFI)

Engine	Twin Cylinder 8 Valve DOHC
Arrangement	Transverse In-line
Displacement	865 cc
Bore x Stroke	90 mm x 68 mm
Compression Ratio	9.2:1
Cylinder Numbering	Left to Right
Firing Order	1-2
Firing Angle	270°
Max. Power (DIN 70020)	61 PS @ 6,800 RPM
Max. Torque	72.4 Nm @ 3,300 RPM

Cylinder Head

Valve Head Dia.	In.	31.0 mm
	Ex.	26.0 mm
Valve Lift	In.	9.5 mm
	Ex.	9.4 mm
Valve Stem Dia.	In	5.463 mm to 5.478 mm (std)
Service limit		5.453 mm
	Ex.	5.451 mm to 5.466 mm (std)
Service limit		5.441 mm
Valve Guide Bore Dia.		5.500 mm to 5.515 mm (std)
Service limit		5.543 mm
Valve Seat Width (in head)		0.9 to 1.1 mm (std)
Service limit		1.5 mm
Valve Seat Width (valve)		1.27 mm - 1.56 mm (std)
Service limit		1.56 mm
Valve Seat Angle		45°
Valve Spring Free Length		42.4 mm (std)
Service limit		41.7 mm
Valve Clearance	In.	0.15 mm to 0.20 mm
	Ex.	0.25 mm to 0.30 mm
Tappet Bucket Bore Dia.		28.015 mm to 28.035 mm (std)
Service limit		28.050 mm
Tappet Bucket Dia.		27.978 mm to 27.993 mm (std)
Service limit		27.970 mm

Full Specification

865 cc America/America LT/Speedmaster with Electronic Fuel Injection (EFI)

Cylinder Head (continued)

Valve Timing	Inlet	Open 4° BTDC (@ 1.0 mm Lift)	
		Close 28° ABDC (@ 1.0 mm Lift)	
		Duration 212°	
	Exhaust	Open 38° BBDC (@ 1.0 mm Lift)	
		Close 7° BTDC (@ 1.0 mm Lift)	
		Duration 212°	
Camshaft Journal Dia.		22.930 mm to 22.960 mm (std)	
Camshaft Journal Clearance		0.03 mm to 0.07 mm (std)	
Service limit		0.012 mm	
Camshaft Journal Bore Dia.		23.000 mm to 23.021 mm (std)	
Camshaft Endfloat		Less than 0.2 mm	
Camshaft Run-out		Less than 0.05 mm	

Barrels and Pistons

Cylinder Bore Dia.	89.991 mm to 90.009 mm (std)	
Service limit	90.034 mm	
Piston Diameter - standard	89.972 mm to 89.988 mm	
Piston Diameter - service limit	89.933 mm	
Piston Ring to Groove Clearance	0.02 mm to 0.06 mm (std)	
Service limit	0.075 mm	
Piston Ring Groove Width	Top	1.01 mm to 1.03 mm
	Second	1.01 mm to 1.03 mm
	Oil	2.01 mm to 2.03 mm
Piston Ring End Gap in Bore	Top	0.15 mm to 0.30 mm
	Second	0.30 mm to 0.45 mm
	Oil	0.20 mm to 0.70 mm
Gudgeon Pin Bore Dia. In Piston	19.002 mm to 19.008 mm (std)	
Service limit	19.030 mm	
Gudgeon Pin Dia.	18.995 mm to 19.000 mm (std)	
Service limit	18.990 mm	

Primary Drive

Primary Drive	Type	Gear
Reduction Ratio	1.74:1 (62/108)	

General Information

Full Specification

865 cc America/America LT/Speedmaster with Electronic Fuel Injection (EFI)

Clutch

Steel Plate Warpage Limit	Less than 0.15 mm
Friction Plate Thickness	3.22 mm to 3.38 mm (std)
Service limit	2.72
Clutch Actuation Method	Cable
Cable Free Play (at lever)	2 mm to 3 mm

Crankshaft/Connecting Rod

Big End Journal Dia	40.946 mm to 40.960 mm (std)
Service limit	40.932 mm
Big End Bearing Clearance	0.036 mm to 0.066 mm (std)
Service limit	0.1 mm
Main Bearing Journal Dia	37.960 mm to 37.976 mm (std)
Service limit	37.936 mm
Main Bearing Clearance	0.019 mm to 0.044 mm (std)
Service limit	0.1 mm
Crankshaft Endfloat	0.05 mm to 0.20 mm (std)
Service limit	0.40 mm
Connecting Rod Small End Dia.	19.016 mm to 19.034 mm (std)
Service limit	19.040 mm
Connecting Rod Big End Side Clearance	0.15 mm to 0.30 mm (std)
Service limit	0.50 mm

Transmission

Type	5 Speed Constant Mesh	
Gear Ratios	1st	2.73:1 (41/15)
	2nd	1.95:1 (37/19)
	3rd	1.55:1 (34/22)
	4th	1.29:1 (31/24)
	5th	1.07:1 (29/27)
Gear Selector Fork Thickness	5.8 mm to 5.9 mm (service limit 5.7 mm)	
Gear Selector Groove Width	6.0 mm to 6.1 mm (service limit 6.2 mm)	
Final Drive	Chain	
Final Drive Ratio	2.333:1 (18:42)	
Chain Type	DID 525 VM2 (112 link)	
20 Link Length	Less than 321 mm	
Drive Chain Freeplay	35-45 mm	
Chain Lubrication	Chain spray suitable for O-ring chains	

Full Specification
**865 cc America/America LT/Speedmaster
with Electronic Fuel Injection (EFI)**
Lubrication

Oil Capacity (approximate)	
Dry fill	4.5 litres
Oil & filter change	3.8 litres
Oil change only	3.3 litres
Recommended Oil	See lubrication section
Oil Pressure (in main gallery)	40 psi @ 4,000 rpm (@ 80°C Oil Temp)
Oil Pump Rotor Tip Clearance	Less than 0.15 mm (std)
Service limit	0.20 mm
Oil Pump Body Clearance	0.15 mm to 0.22 mm (std)
Service limit	0.35 mm
Oil Pump Rotor End Float	0.02 mm to 0.07 mm (std)
Service limit	0.10 mm

Ignition System

Type	Digital Inductive
Electronic Rev-Limiter	8,000 rpm
Pick Up Coil Air Gap	0.8 mm ±0.2 mm
Spark Plug Type	NGK DPR8EA-9
Spark Plug Gap	0.8 mm to 0.9 mm

Fuel System

Fuel Type	Unleaded, 91 RON (U.S. 87 CLC/AKI)
Fuel Tank Capacity	19.5 Litres
Fuel Pump	Submerged electric
Fuel Pressure (nominal)	3.0 Bar
Purge Control System	Electronic, via fuel system ECM

Fuel Injection System

Type	Sequential electronic fuel injection
Idle Speed	1,000 ±50 rpm
Injector Type	Twin jet, solenoid operated plate valve
Throttle	Cable/twist grip/electronic throttle potentiometer
Control Sensors	Barometric pressure, manifold absolute pressure (2 off), throttle position, oil temperature, crankshaft position, lambda (oxygen) (2 off), induction air temperature

Emissions Control Equipment

Type	Twin catalysts with pulsed secondary air injection
Evaporative control	Activated carbon canister (California only)

General Information

Full Specification

865 cc America/America LT/Speedmaster with Electronic Fuel Injection (EFI)

Suspension

Front Fork Travel	130 mm America up to VIN 468389 and Speedmaster up to VIN 469049 120 mm America and America LT from VIN 468390 and Speedmaster from VIN 469050
Recommended Fork Oil Grade	Kayaba G10
Oil Level (fork fully compressed)	161 mm below inner tube upper surface - America up to VIN 468389 and Speedmaster up to VIN 469049
	135 mm below inner tube upper surface - America and America LT from VIN 468390 and Speedmaster from VIN 469050
Oil Volume (dry fill)	552 cc - America up to VIN 468389 and Speedmaster up to VIN 469049
	561 cc - America and America LT from VIN 468390
	555 cc - Speedmaster from VIN 469050
Rear Wheel Travel	96 mm
Rear Suspension Bearing Grease	Grease to NLGI 2 specification

Brakes

Pad Friction Material Minimum Thickness	1.5 mm (front and rear)
Front Disc Dia.	310 mm
Front Disc Thickness	5.5 mm (service limit 5.0 mm)
Front Disc Run-out - standard	Less than 0.15 mm
Front Disc Run-out - service limit	0.30 mm
Rear Disc Dia	285 mm
Rear Disc Thickness	6.0 mm (service limit 5.5 mm)
Rear Disc Run-out - standard	Less than 0.15 mm
Rear Disc Run-out - service limit	0.30 mm
Recommended Fluid	DOT 4

Wheels and Tyres

Wheel Rim Axial Run-out	0.6 mm
Wheel Rim Radial Run-out	0.6 mm
Tyres	See Owner's Handbook
Tyre Pressures	See section 15
Front Tyre Tread Depth min.	2.0 mm
Rear Tyre Tread Depth min.	2.0 mm (3.0 mm > 80 mph / 130 km/h)



Warning

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

General Information

Full Specification

865 cc America/America LT/Speedmaster with Electronic Fuel Injection (EFI)

Frame

Overall Length	2,420 mm America up to VIN 468389 and Speedmaster up to VIN 469049
	2,387 mm America and America LT from VIN 468390
	2,370 mm Speedmaster from VIN 469050
Overall Width	960 mm America up to VIN 468389
	920 mm America and America LT from VIN 468390
	830 mm Speedmaster up to VIN 469049
Overall Height	895 mm Speedmaster from VIN 469050
	1,170 mm America up to VIN 468389
	1,175 mm America from VIN 468390
	1,480 mm America LT
	1,160 mm Speedmaster up to VIN 469049
Wheelbase	1,170 mm Speedmaster from VIN 469050
	1,655 mm America up to VIN 468389 and Speedmaster up to VIN 469049
Seat Height	1,610 mm America and America LT from VIN 468390 and Speedmaster from VIN 469050
	720 mm America up to VIN 468389 and Speedmaster up to VIN 469049
	690 mm America and America LT from VIN 468390
Castor	690 mm Speedmaster from VIN 469050
Castor	33.4°
Trail	153 mm America up to VIN 468389 and Speedmaster up to VIN 469049
	155 mm America and America LT from VIN 468390
	168 mm Speedmaster from VIN 469050
Wet Weight	250 kg (Speedmaster)
	250 kg (America and America LT)
Max. Payload (rider, passenger, luggage & accessories	200 kg America and Speedmaster
	180 kg America LT

Electrical Equipment

Battery Type	Sealed
Battery Rating	12V-10 Ah
Alternator Rating	24A @ 2,000 rpm
	26A @ 4,000 rpm
Fuses	See chapter 17

General Information

Torque Wrench Settings - America, America LT & Speedmaster

Cylinder Head/Camshafts

Application	Torque (Nm)	Notes
Camshaft cover to cylinder head bolts	14	Apply engine oil to seals. Refer to section 3
Camshaft bearing caps to head bolts	10	Lubricate threads with engine oil. Refer to section 3
Camshaft oil feed pipe to bearing cap bolts	8	
Camshaft chain tensioner body to crankcase bolts	9	
Camshaft chain tensioner centre bolt	20	
Camshaft chain drive gear shaft retaining bolt	10	Prior to engine number 186916
Camshaft chain drive gear shaft retaining bolt	28	From engine number 186916
Cylinder head nuts	*	Refer to section 3
Cylinder head studs	10	
Camshaft chain guide blade to cylinder head bolts	10	Use new fixing(s)
Camshaft chain tensioner blade to cylinder head nut	10	Apply ThreeBond 1305 to threads
Oil cooler feed pipe to cylinder head banjo bolts	30	Fit new sealing washer
Low oil pressure warning light switch (oil feed pipe to cylinder head)	13	Fit new sealing washer
Spark plug	20	
Exhaust pipe stud	10	Fit new stud

Clutch

Application	Torque (Nm)	Notes
Clutch cover to crankcase bolts	10	
Gearchange lever clamp bolt	9	
Clutch centre nut	105	Fit a new nut and bevel washer
Clutch release plate to pressure plate bolts	9	
Clutch lever mounting clamp bolts	12	Tighten upper bolt first then lower bolt
Starter (sprag) clutch housing to crankshaft bolts	16	Use new fixing(s)
Centrifugal breather to crankshaft screws - If fitted	12	Use new fixing(s)
Clutch lever pivot bolt	1	
Clutch lever pivot nut	6	

Engine mountings

Application	Torque (Nm)	Notes
Front and rear upper mounting bolts	80	
Frame-downtube to frame bolts - up to VIN 333839 (coloured black)	55	See Technical News 99
Frame-downtube to frame bolts - from VIN 333840 (coloured silver)	40	See Technical News 99
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 7
Connecting rod big end bolt nuts	*	Refer to section 7
Centrifugal breather to crankshaft screws - if fitted	12	Use new fixing(s)
Crankshaft spacer	12	Use new fixing(s)
Starter (sprag) clutch housing to crankshaft bolts	16	Use new fixing(s)
Balancer shaft lock washer to crankcase screw	12	Use new fixing(s)
Crankcase dry seal plug	15	Apply ThreeBond 1305 to threads
Lower breather plate	9	Use new fixing(s)
Breather drain pipe	9	Use new fixing(s)

Transmission

Application	Torque (Nm)	Notes
Gearchange mechanism cover bolts	8	
Selector fork shaft retaining plate screw	12	Use new fixing(s)
Selector drum cam retaining bolt	12	Use new fixing(s)
Gearchange shaft abutment bolt	18	Apply ThreeBond 1305 to threads
Detent arm retaining bolt	12	Use new fixing(s)
Neutral switch	10	Fit new sealing washer
Sprocket cover to crankcase	10	
Chainguard front fixing to swinging arm	7	
Chainguard rear fixing to swinging arm	10	Use new fixing(s)
Gearchange rod lock nuts	6	
Gearchange lever pinch bolt	9	
Output sprocket to output shaft	132	

General Information

Lubrication System

Application	Torque (Nm)	Notes
Sump drain plug	25	Fit new sealing washer
Oil filter	10	Refer to section 9
Oil filter adaptor to crankcase	10	Apply ThreeBond 1305 to threads
Low oil pressure warning light switch	13	Fit new sealing washer
Oil cooler mounting bolts	8	
Oil feed pipe to cylinder head banjo bolts (M14 bolts, upper pipe)	30	Fit new sealing washer
Oil feed pipe to oil cooler banjo bolt (M18 bolt, upper pipe)	45	Fit new sealing washer
Oil return pipe to sump banjo bolt to cooler (M18 bolt, lower pipe)	45	Fit new sealing washer
Oil return pipe union to sump adapter	15	
Oil return pipe union sump adapter	45	Fit new sealing washer
Oil pick-up strainer screws	6	Use new fixing(s)
Sump to crankcase bolts	10	Refer to section 9
Oil pump to crankcase bolts	12	
Oil pressure relief valve	15	Apply ThreeBond 1305 to threads
Oil temperature sensor	18	Apply ThreeBond 1374 to threads
Sight glass oil level	30	
Oil filler plug	3	
Oil feed pipe for input shaft	8	
Oil feed pipe to cylinder head banjo bolt (crankcase end)	25	

Fuel System/Exhaust

Application	Torque (Nm)	Notes
Fuel tank mounting bolt	19	
Warning light plinth to tank	3	
Airbox mounting bolts	9	
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	15	
Silencer mounting (passenger footrest) fixing	15	
Silencer clamp	22	
Fuel tank badge to tank	4.5	
Fuel pump plate	5	
Fuel pressure relief valve	4	
Fuel pump bracket to pump plate	10	Use new fixing(s)
Fuel pump baffle clip	3	
Carburettor 865 cc engine/Throttle body transition pieces	12	
Carburettor 790 cc engine transition piece to cylinder head	-	Refer to section 10A
MAP sensor	3	
Barometric pressure sensor	3	
Intake air temperature sensor	5	
Fall detection switch	3	Use new fixing(s)
Oxygen sensors	25	
Road speed sensor	10	
Carburettor/Throttle body to transition piece clip	1.5	
Secondary air injection pipe to cylinder head	18	
Crankshaft position sensor (EFI models)	6	Use new fixing(s)
Ignition pick-up coil (carburettor models)	10	Use new fixing(s)
Air filter	3	
Venturi clip	1.5	
Airbox covers	3	
Airbox cover bracket	3	
Evaporative canister bracket - if fitted	12	
Engine temperature sensor	18	
Fuel tank console	3	
Fuel tap - carburettor models	9	
Fuel pump plate to fuel tank	5	
Throttle position sensor	3.5	
Throttle Bodies	6	

General Information

Braking System

Application	Torque (Nm)	Notes
Brake caliper bleed nipple	6	
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	Fit new sealing washer
Front brake master cylinder mounting clamp bolts	12	Tighten upper bolt first then lower bolt
Front brake master cylinder cover screws	1	
Front brake disc bolts	22	Use new fixing(s)
Rear brake fluid reservoir mounting screw	3	
Front brake lever pivot	1	
Front brake lever pivot nut	6	
P-clip	6	
Rear brake caliper mounting bolts	40	
Rear brake caliper pad retaining pins	18	
Rear brake hose to caliper banjo bolt	25	Fit new sealing washer
Rear brake pipe to master cylinder and joint block (steel pipe)	25	
Rear brake master cylinder mounting bolts	15	
Rear brake master cylinder pushrod clevis lock nuts	18	
Rear brake light switch	15	Fit new sealing washer
Rear brake disc retaining bolts	22	Use new fixing(s)
Rear brake master cylinder reservoir	3	
Brake pedal pivot bolt	27	Use new fixing(s)
Brake hose wire guide	9	

Front Suspension/Steering

Application	Torque (Nm)	Notes
Top yoke fork clamp bolt - America up to VIN 468389, Speedmaster up to VIN 469049	26	
Top yoke fork clamp bolt - America and America LT from VIN 468390, Speedmaster from VIN 469050	24	
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	3	
Fork cover to bottom yoke - except Speedmaster from VIN 469050	9	
Steering head bearing adjuster nut lock nut	40	Refer to section 12
Steering stem top nut	90	
Handlebar mounting clamp to top yoke - except America from VIN 468390 and Speedmaster from VIN 469050	45	
Lower yoke hose guide - Speedmaster from VIN 469050	20	
Upper yoke cable guide	20	
Handlebar riser to top yoke - Speedmaster from VIN 469050	62	
Handlebar riser to top yoke - America and America LT from VIN 468390	38	
Speedometer cable - motorcycles with cable driven speedometer	2	

Rear Suspension

Application	Torque (Nm)	Notes
Rear suspension unit mounting bolts	28	Refer to section 13
Swinging arm spindle nut	110	
Swinging arm clamp bolts	40	
Chain adjuster	2	
P-clip to swingarm	6	
Chain rubbing strip	7	Use new fixing(s)

General Information

Footrests

Application	Torque (Nm)	Notes
Rider footrest mounting bar to frame	27	
Rider footrest clevis bracket to mounting bar (right hand and left hand M8 bolt)	15	
Rider footrest clevis bracket to mounting bar (left hand M10 bolt)	40	
Rider footrest bracket locating bolt (left hand side only, America up to VIN 468389, Speedmaster up to VIN 469049)	9	
Rider footrest rubber to footrest, Speedmaster from VIN 614195	4	
Bank angle indicator to footrest	9	Apply ThreeBond 1360 to threads
Bank angle indicator to footrest, America and America LT from VIN 611105 (except VIN 611134)	6	
Rear footrest hanger to frame	24	
Passenger footrest	17	

Frame/Bodywork

Application	Torque (Nm)	Notes
Front seat to mudguard fixing	12	
Rear seat to mudguard fixing	10	
Front mudguard to bracket bolts	3	
Front mudguard bracket to fork bolts	12	
Rear mudguard to bracket side screws - America and Speedmaster	25	
Rear mudguard to frame cross-beam screws	30	
Rear mudguard bracket to frame rear screws	60	
Side stand pivot bolt	25	
Side stand pivot bolt nut	25	
Side stand switch	5	Use new fixing(s)
Airbox cover/airbox wiring cover	3	
Fuel tank infill panels	4	
Seat bayonet to mudguard	3	
Instruments bracket to frame	9	
Instrument cover	1	
Mirror	10	
Rider's seat fixing - America up to VIN 468389	12	
Passenger seat fixing- America up to VIN 468389	10	
Passenger backrest pad to passenger backrest - America LT	8	
Passenger backrest to mounting brackets - America LT	9	
Rear mudguard to bracket threaded studs - America LT	15	
Pannier/passenger backrest mounting brackets to threaded studs - America LT	25	
Panniers to mounting brackets - America LT	8	
Windscreen mounting points to brackets - America LT	9	
Windscreen to latch brackets - America LT	8.5	
Windscreen latches to latch brackets - America LT	9	
Windscreen lower mounting bracket to bottom yoke - America LT	20	

General Information

Wheels

Application	Torque (Nm)	Notes
Front wheel spindle fixing - except Speedmaster from VIN 469050	60	
Front wheel spindle fixing - Speedmaster from VIN 469050	95	
Front wheel spindle clamp bolt	22	
Rear wheel spindle nut	110	

Final Drive

Application	Torque (Nm)	Notes
Rear wheel spindle nut	110	
Drive chain adjuster bolts	2	Tighten anti-clockwise
Chainguard to swinging arm front screw	7	
Chainguard to swinging arm rear screw	10	Use new fixing(s)
Front sprocket cover bolts	10	
Front sprocket nut	132	Secure in position with lockwasher
Rear sprocket nuts	85	
Rear sprocket carrier studs	30	

Electrical System/Ignition

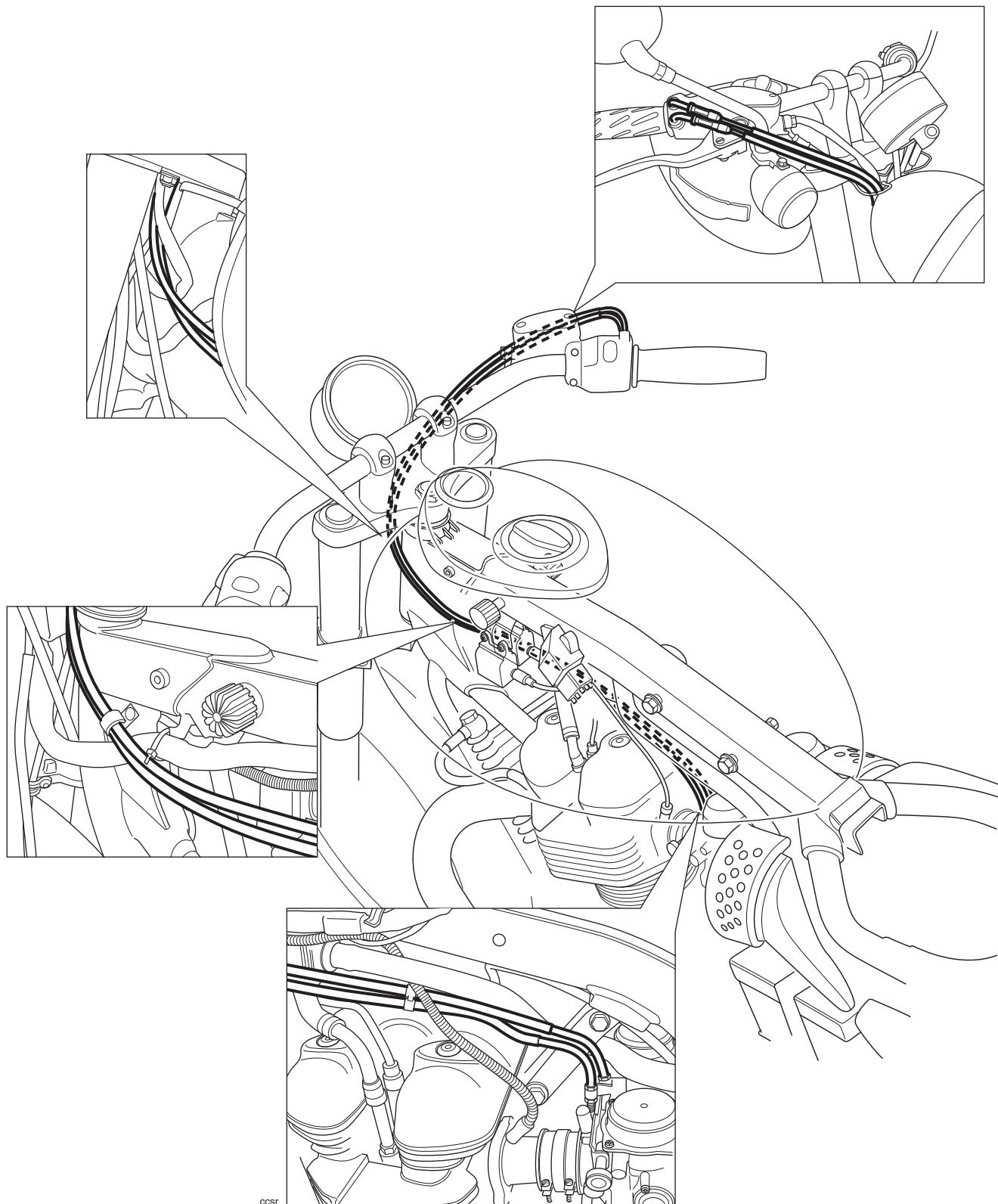
Application	Torque (Nm)	Notes
Headlight mounting bracket to lower yoke - except America from VIN 468390 Speedmaster from VIN 469050	27	
Headlight mounting bracket to lower yoke - America and America LT from VIN 468390 Speedmaster from VIN 469050	21	
Headlight to bracket - except America from VIN 468390 Speedmaster from VIN 469050	27	
Headlight to bracket - America and America LT from VIN 468390	12	
Headlight to bracket - Speedmaster from VIN 469050	9	
Headlight rim	3	
Speedometer bracket to top yoke	9	
Rear light lens fixings	3	
Rear light bracket to mudguard	3	
Front indicator to bracket - except America from VIN 468390	10	
Front indicator cover	5	Use new fixing(s)
Front indicator to bracket - America and America LT from VIN 468390	8	
Front indicator bracket to hand controls America up to VIN 468389 and Speedmaster	10	
Front indicator bracket to lower yoke - America from VIN 468390	10	
Front indicator bracket to lower yoke - America LT	10	

General Information

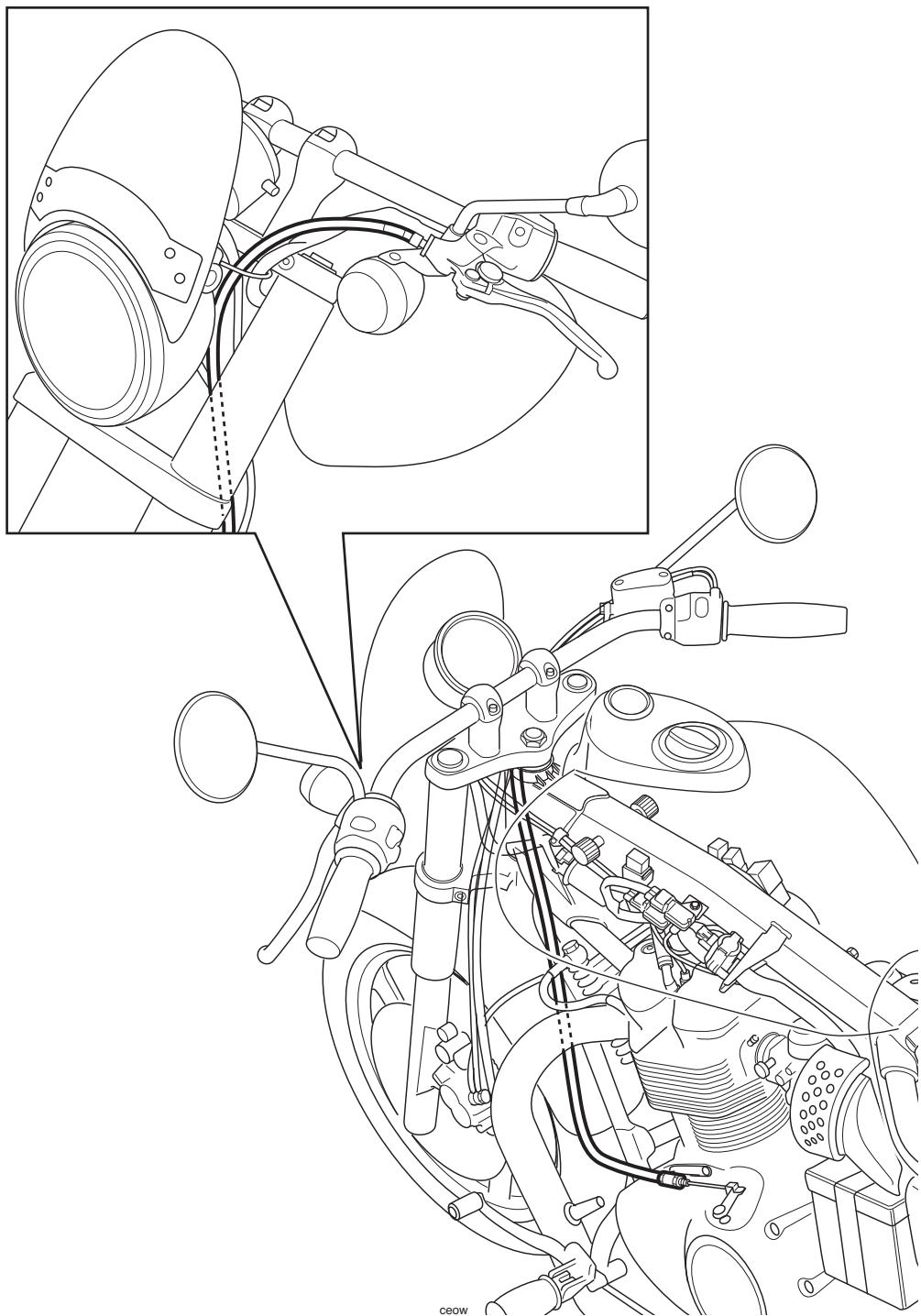
Application	Torque (Nm)	Notes
Rear indicator mounting nuts - except Speedmaster from VIN 469050	18	Apply ThreeBond TB1305 to threads
Rear indicator mounting nuts - Speedmaster from VIN 469050	6	
Handlebar switch retaining screws	2.5	
Horn	24	
Ignition switch screws	5	
Alternator rotor bolt M10 bolt M12 bolt	98 120	
Alternator stator to cover bolts	12	
Alternator stator wiring clamp to cover screw	7	
Alternator cover to crankcase bolts	10	
Regulator/rectifier fixings	9	
Starter motor to crankcase bolts	10	
Starter motor lead terminal nut	7	
Starter solenoid lead terminal nut	5	
Ignition pick-up coil screws (carburettor models)	10	Use new fixing(s) Ensure coil air gap is correctly set
Crankshaft position sensor (EFI models)	6	Use new fixing(s)
Ignition coils	9	
Igniter unit retaining bolt	8	

General Information

Throttle Cable Routing - America, America LT & Speedmaster

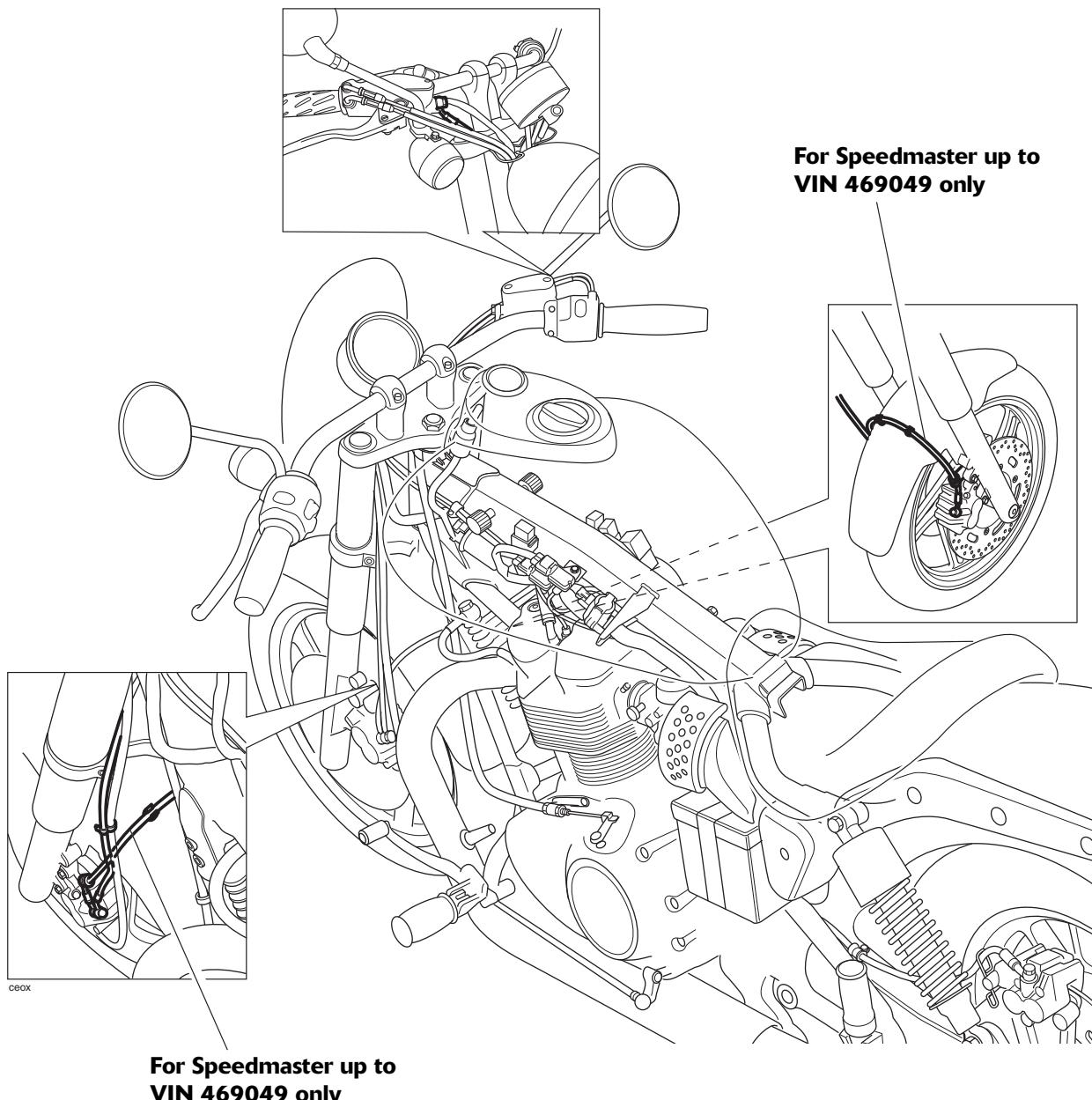


Clutch Cable Routing - America, America LT & Speedmaster

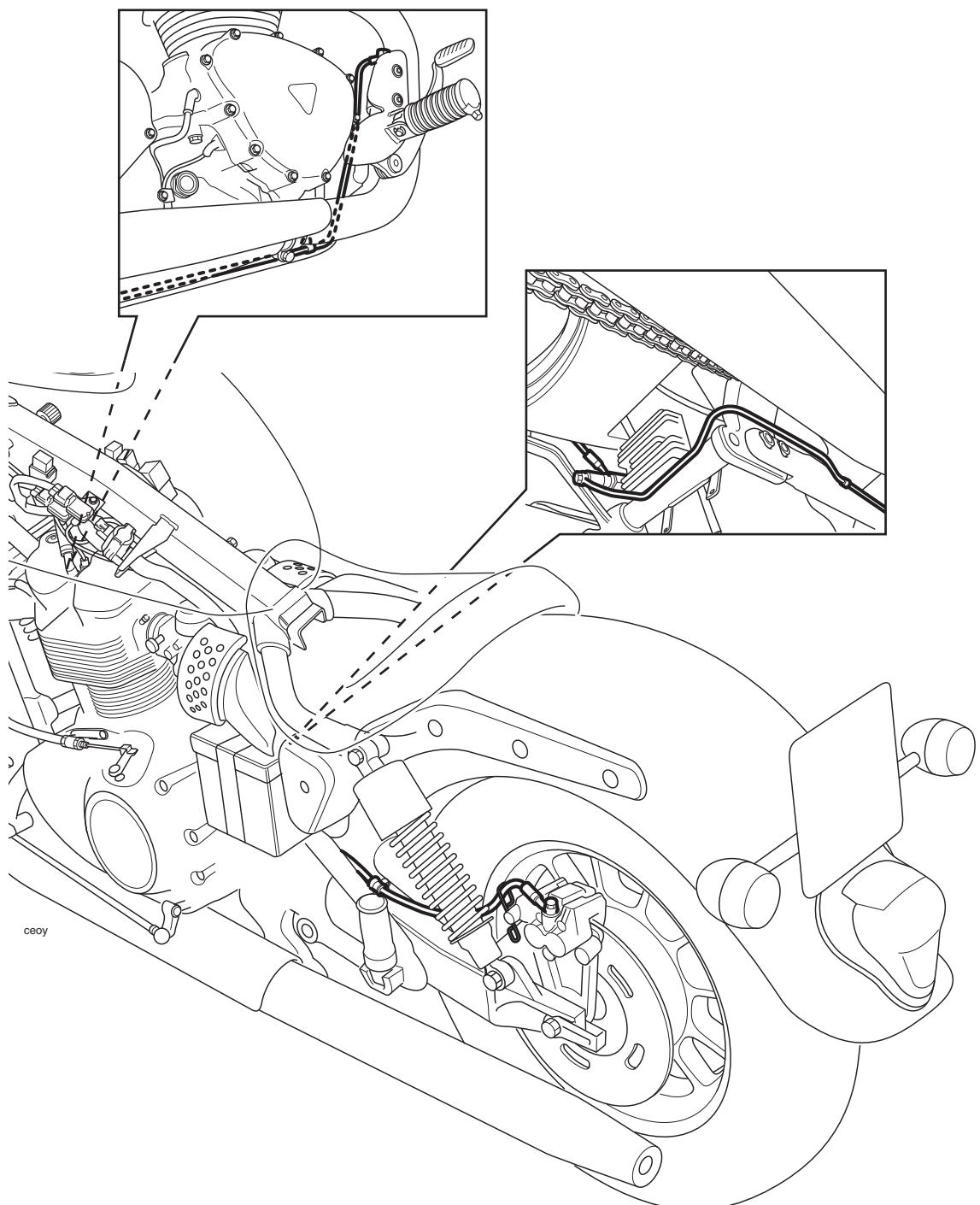


General Information

Front Brake Hose Routing - America, America LT & Speedmaster

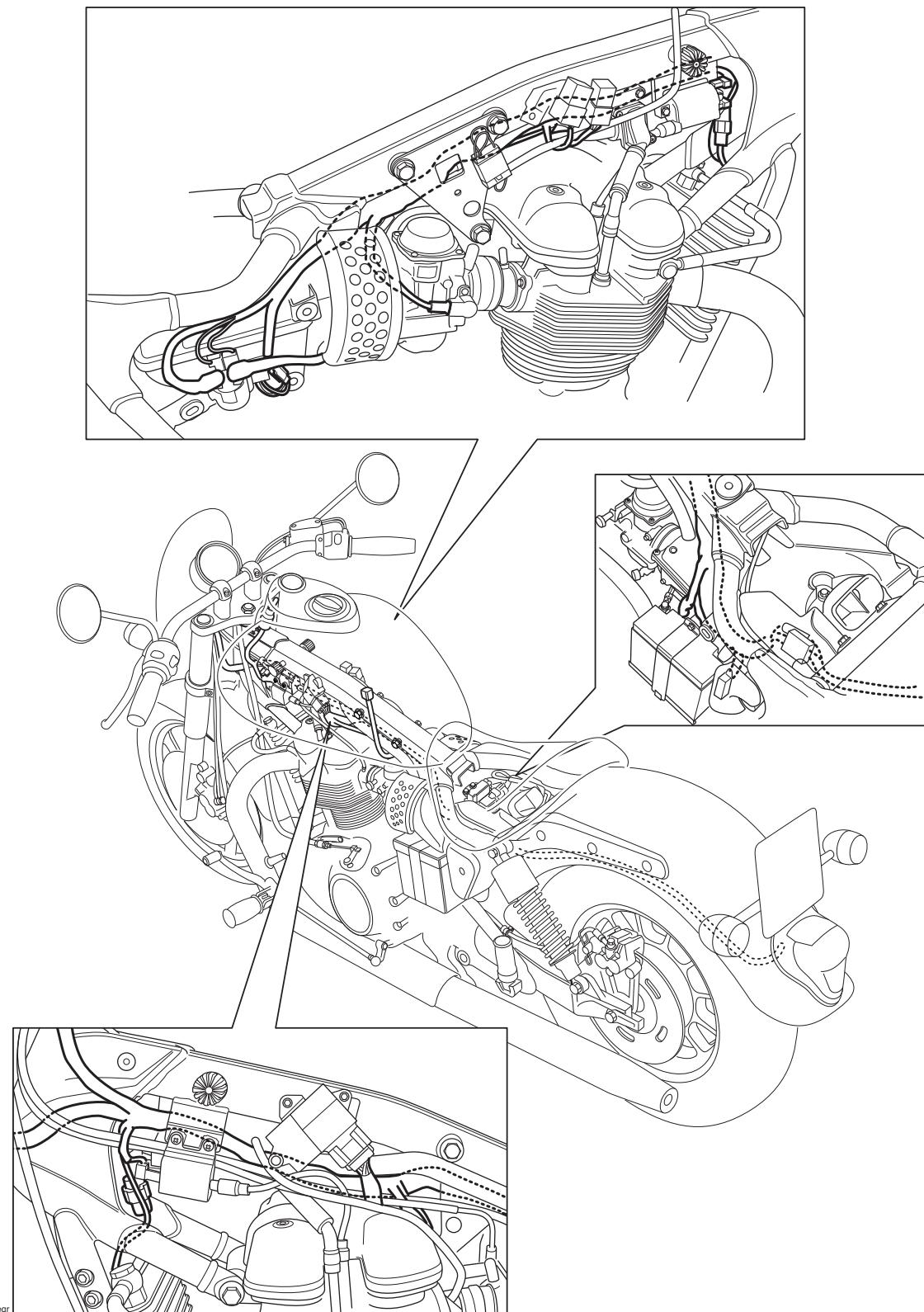


Rear Brake Hose Routing - America, America LT & Speedmaster

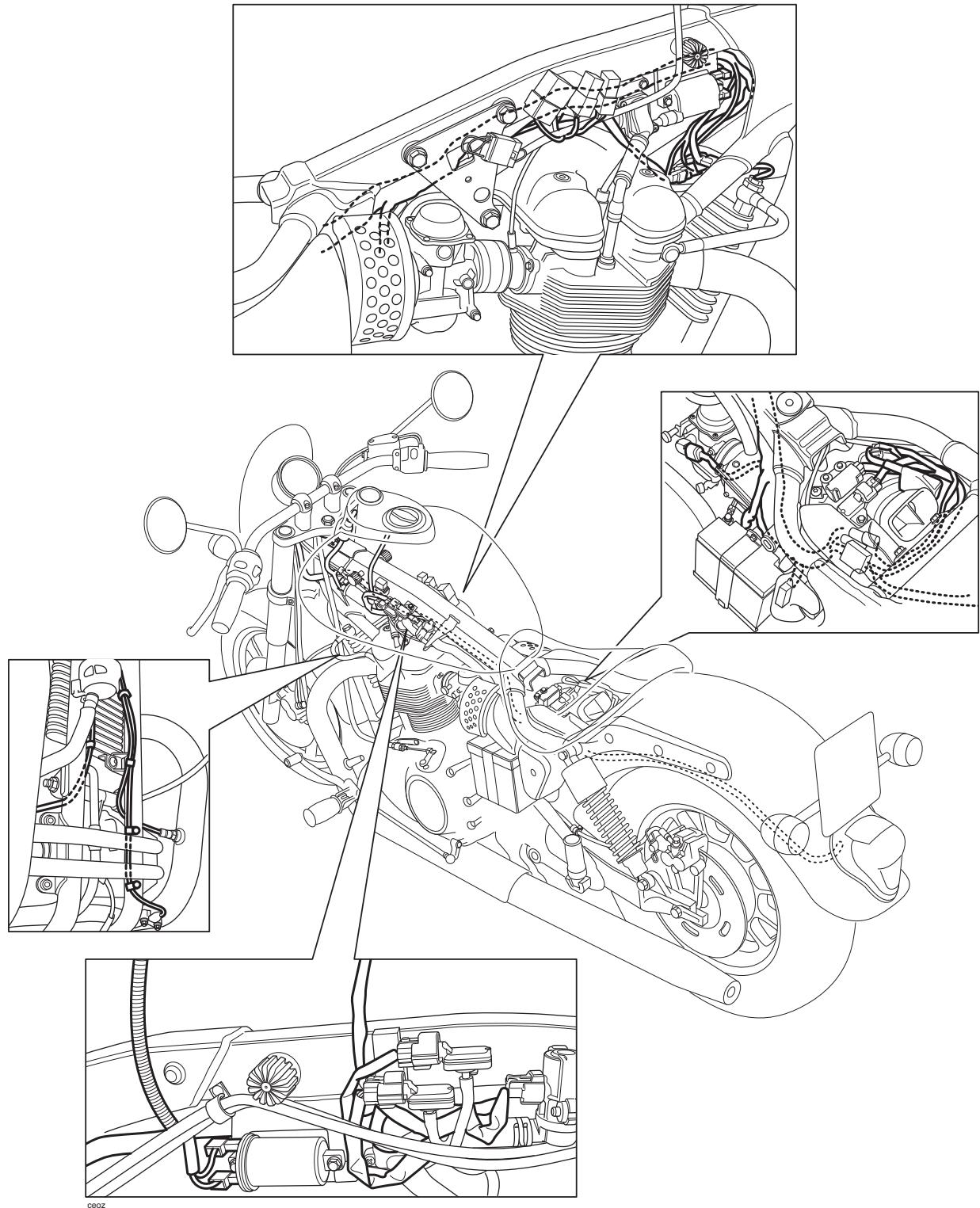


General Information

Main Wiring Harness Routing - America & Speedmaster - Carburettor Models



Main Wiring Harness Routing - America, America LT & Speedmaster - Fuel Injection Models



General Information

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2 Scheduled Maintenance

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Scheduled Maintenance Chart	2.3

Scheduled Maintenance

Introduction

To maintain the motorcycle in a safe and reliable condition, the maintenance and adjustments outlined in this section must be carried out as specified in the schedule of daily checks, and also in line with the scheduled maintenance chart.

Weather, terrain and geographical location affects maintenance. The maintenance schedule should be adjusted to match the particular environment in which the vehicle is used and the demands of the individual owner. For advice on adjusting the service schedule, consult your authorised Triumph dealer.



Warning

In order to correctly carry out the maintenance items listed in the scheduled maintenance chart, special tools and specialist knowledge will be required. As only an authorised Triumph dealer will have this knowledge and equipment, Triumph strongly recommends that your authorised Triumph dealer carries out all scheduled maintenance.

A dangerous riding condition could result from incorrect maintenance leading to loss of motorcycle control and an accident.



Warning

All maintenance is vitally important and must not be neglected. Incorrect maintenance or adjustment may cause one or more parts of the motorcycle to malfunction. A malfunctioning motorcycle is dangerous and may lead to an accident.



Warning

Triumph Motorcycles cannot accept any responsibility for damage or injury resulting from incorrect maintenance or improper adjustment carried out by the owner.

Since incorrect or neglected maintenance can lead to a dangerous riding condition, always have an authorised Triumph dealer carry out the scheduled maintenance of this motorcycle.

Scheduled Maintenance Chart

Operation Description	Odometer Reading in Miles (Kms) or time period, whichever comes first					
		First Service	Annual Service	Mileage-based service		
	Every	500 (800) 1 month	Year	6,000 and 18,000 (10,000 and 30,000)	12,000 (20,000)	24,000 (40,000)
Engine & oil cooler - check for leaks	Day	•	•	•	•	•
Engine oil - renew	-	•	•	•	•	•
Engine oil filter - renew	-	•	•	•	•	•
Valve clearances - check	-				•	•
Air cleaner - renew	-				•	•
Spark plugs - check	-			•		
Spark plugs - renew	-				•	•
Autoscan - carry out a full Autoscan using the Triumph Diagnostic tool (print a customer copy)*	-	•	•	•	•	•
Engine ECM - check for stored DTCs and latest calibration*	-	•	•	•	•	•
Fuel filter - renew*	-				•	•
Fuel system - check for leaks	Day	•	•	•	•	•
Throttle bodies - balance*	-		•	•	•	•
Carburetors - balance (carburetor models only)			•	•	•	•
Throttle cables - check/adjust	Day	•	•	•	•	•
Lights, instruments & electrical systems - check	Day	•	•	•	•	•
Steering - check for free operation	Day	•	•	•	•	•
Headstock bearings - check/adjust	-	•	•	•	•	•
Headstock bearings - lubricate	-				•	•
Forks - check for leaks/smooth operation	Day	•	•	•	•	•
Fork oil - renew	-					•
Brake fluid levels - check	Day	•	•	•	•	•
Brake fluid - renew		Every 2 years				
Brake pad wear - check	Day	•	•	•	•	•
Brake master cylinders - check for leaks	-	•	•	•	•	•
Brake calipers - check for leaks and seized pistons	-	•	•	•	•	•
Brake light - check operation	Day	•	•	•	•	•
Drive chain - lubricate		Every 200 miles (300 km)				
Drive chain - wear check		Every 500 miles (800 km)				
Drive chain slack - check/adjust	Day	•	•	•	•	•
Drive chain rubbing strip - check	-		•	•	•	•
Fasteners - inspect visually for security	Day	•	•	•	•	•
Wheels - inspect for damage	Day	•	•	•	•	•

*Fuel injected models only

Scheduled Maintenance

Operation Description	Odometer Reading in Miles (Kms) or time period, whichever comes first					
		First Service	Annual Service	Mileage-based service		
	Every	500 (800) 1 month	Year	6,000 and 18,000 (10,000 and 30,000)	12,000 (20,000)	24,000 (40,000)
Spokes (where fitted) - check wheels for broken or damaged spokes/check spoke tightness	Day	•	•	•	•	•
Wheel bearings - check for wear/smooth operation		•	•	•	•	•
Tyre wear/tyre damage - check	Day	•	•	•	•	•
Tyre pressures - check/adjust	Day	•	•	•	•	•
Clutch cable - check/adjust	Day	•	•	•	•	•
Stand - check operation	Day	•	•	•	•	•
Secondary exhaust clamp bolt - check/adjust	-	•	•	•	•	•
Secondary air injection system - check	-				•	•
Fuel and evaporative loss* hoses - renew	Every 4 years, regardless of mileage					

*Evaporative system fitted to models for certain markets only

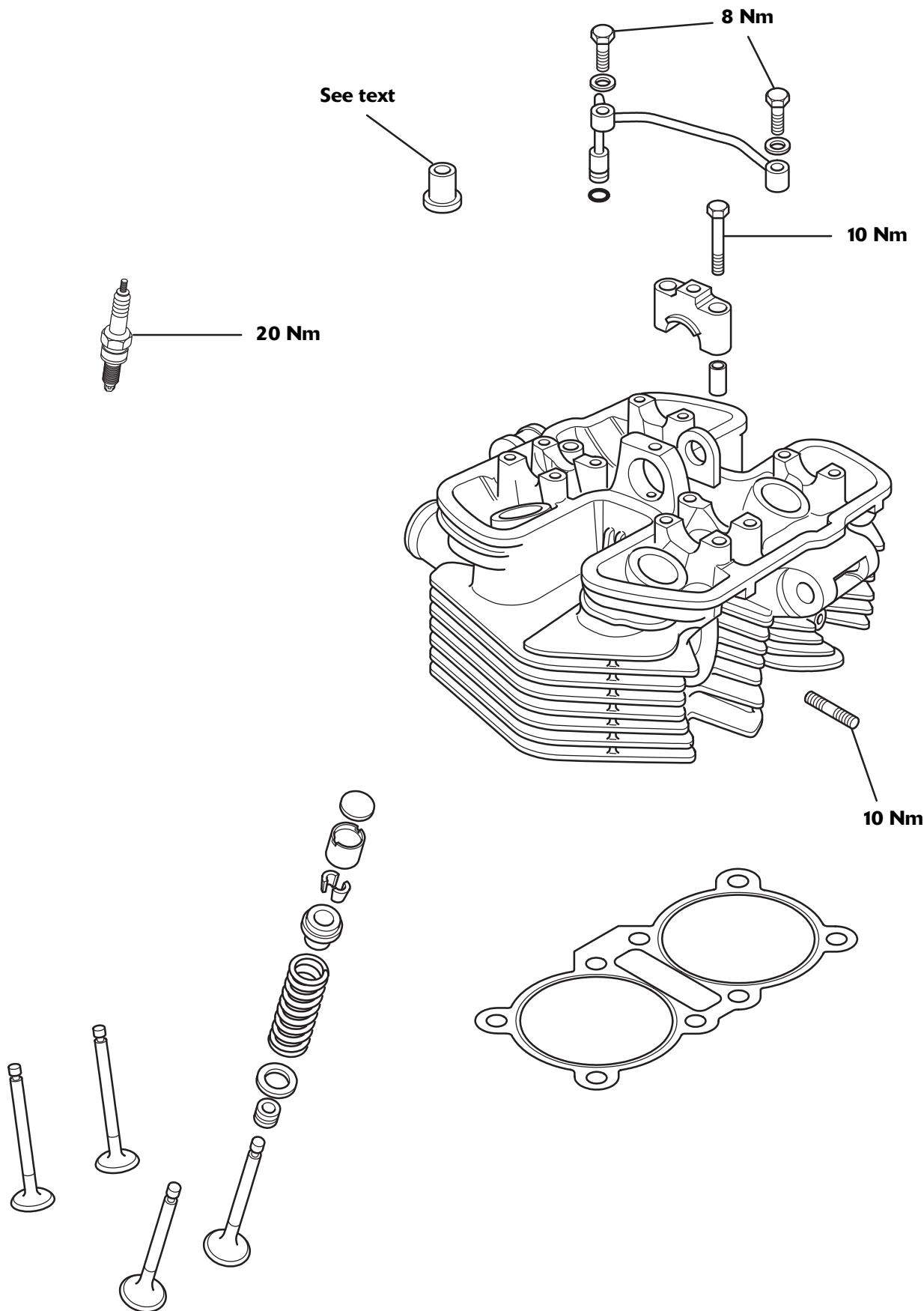
3 Cylinder Head & Camshafts

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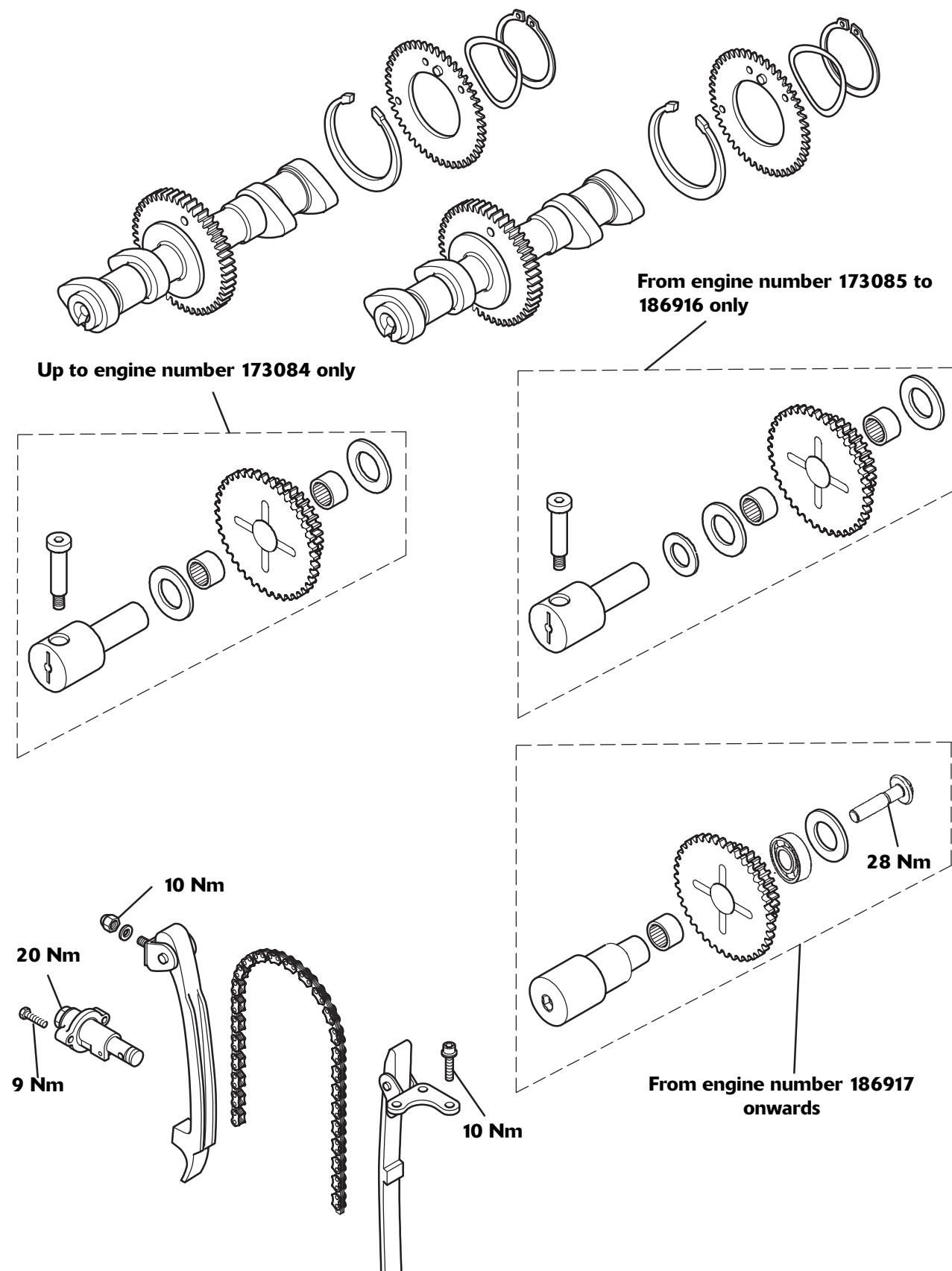
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Cylinder Head & Camshafts

Exploded View Cylinder Head and Valves



Exploded View Camshafts and Camshaft Drive



Cylinder Head & Camshafts

General Description

The engine is fitted with an aluminium 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.

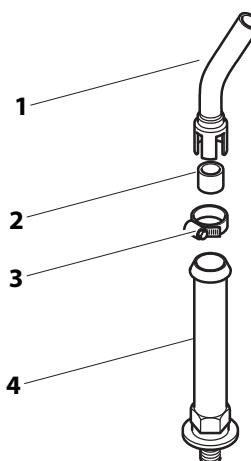
Both the tip and seating face of the valves are hardened to give a long service life. Due to methods used in assembly, the valve seats and valve guides cannot be replaced.

Camshaft Cover

Removal

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

- Remove seat.
 - Disconnect battery, negative (black) lead 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.



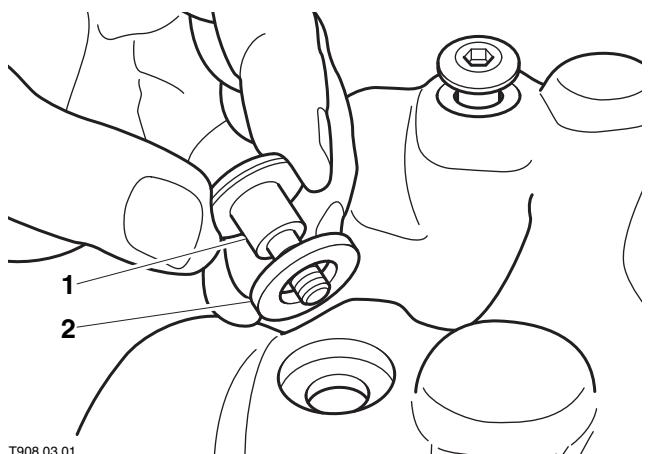
1. Pipe

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.



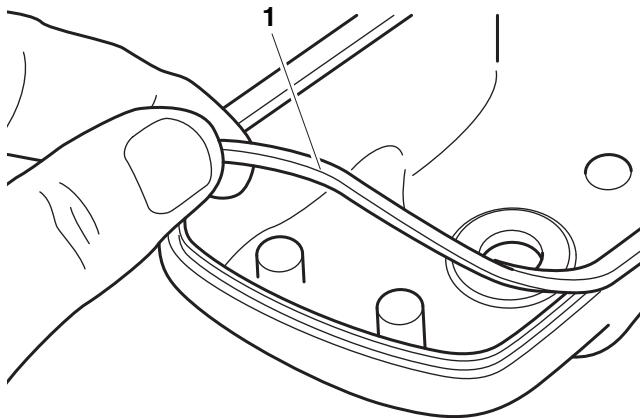
1. Camshaft cover bolt

2. Seal

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

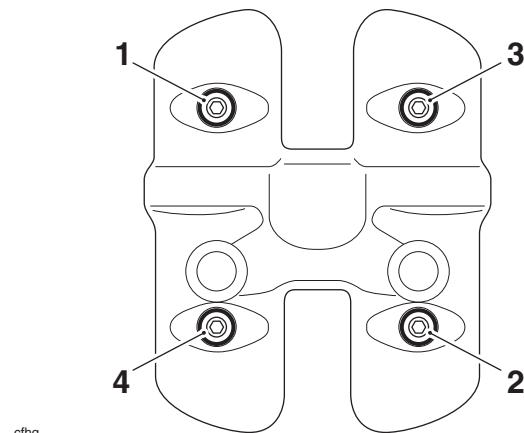
Installation

1. Install a new camshaft cover seal and cover bolt seals.
2. Ensure the cover seal groove and cylinder head mating surfaces are clean and dry then fit the seal to the cover.



1. Camshaft cover seal

3. Fit the camshaft cover to the cylinder head ensuring the seal remains correctly seated in its groove.
4. Lubricate the new camshaft cover bolt seals with clean engine oil.
5. Fit the cover bolt seals with their steel sides upwards then fit the cover bolts.
6. Tighten the camshaft cover bolts to **14 Nm** in the sequence shown below.



Camshaft Cover Bolts Tightening Sequence

7. Seat the secondary air injection pipes and seals back on the cylinder head adaptors and secure in position with the retaining clips.
8. Refit all components removed for access.

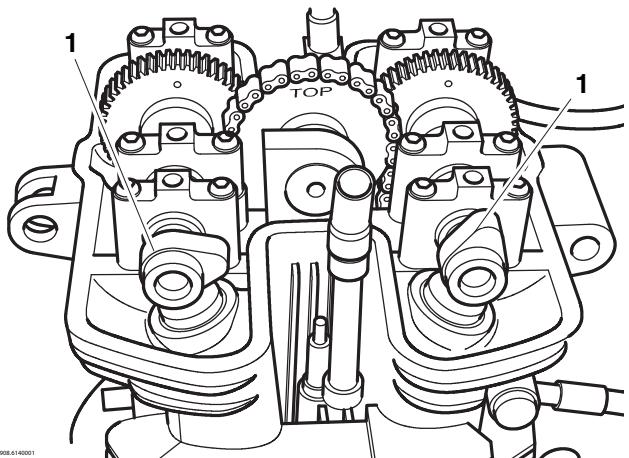
Camshafts

Removal

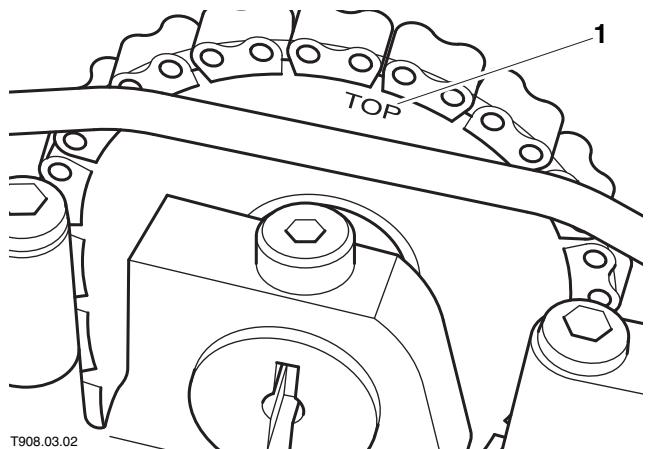
Note:

- 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 (see page 3-4).
2. Remove the alternator cover from the right hand side of the crankcase (see page 17-34).
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.



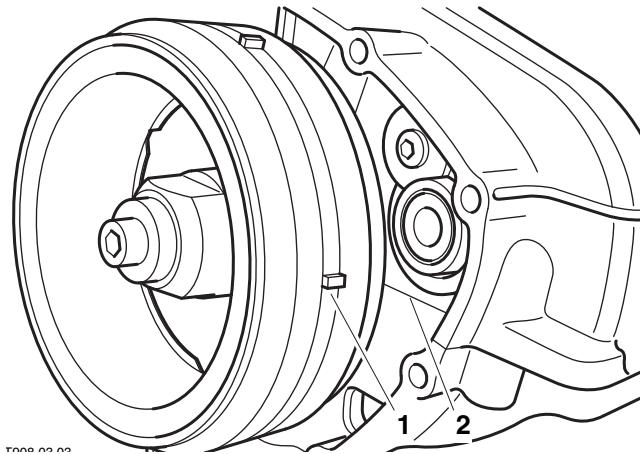
1. Right hand cylinder camshaft lobe positions



1. Camshaft drive gear TOP mark

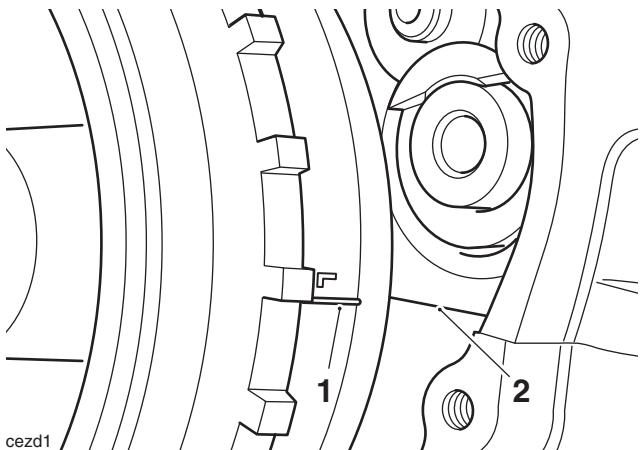
Cylinder Head & Camshafts

4. **Carburettor models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



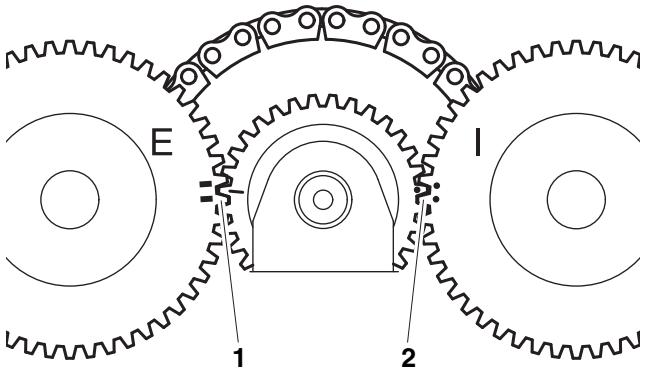
1. Alternator rotor timing mark 'L'
2. Crankcase joint

5. **Fuel Injection (EFI) models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



1. Alternator rotor timing mark 'L'
2. Crankcase joint

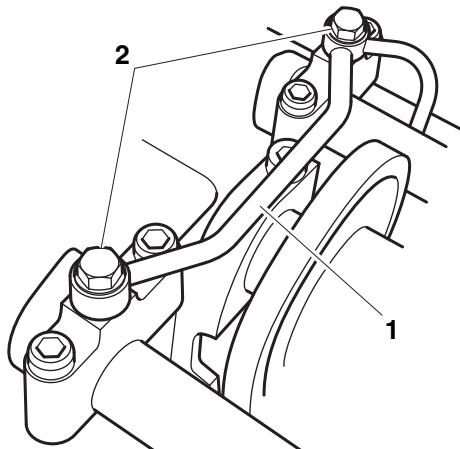
6. Check the position of the timing marks on the left hand side of the camshaft gears and drive gear. The drive gear line should be positioned between the two lines on the exhaust camshaft gear and its dot should be positioned between the two dots on the inlet camshaft gear.



T908.03.04

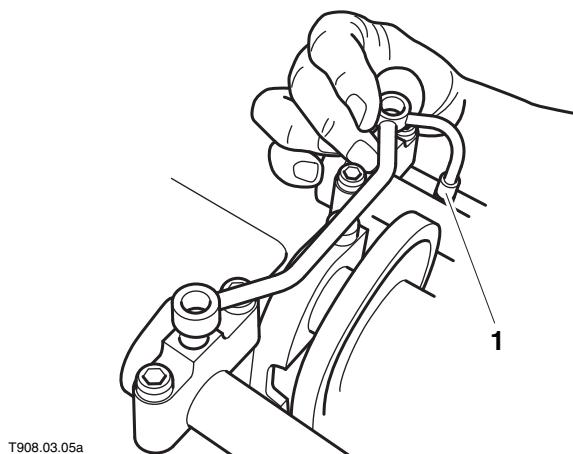
1. Exhaust camshaft timing marks
2. Inlet camshaft timing marks

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

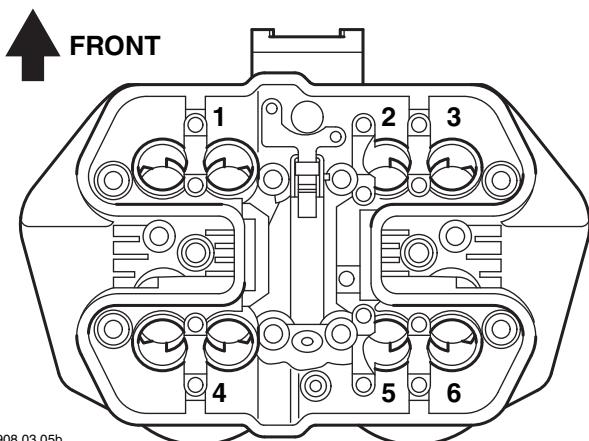
8. Ease out the oil feed pipe along with its O-ring.



T908.03.05a

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 indicate 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.



T908.03.05b

Cylinder Head/Camshaft Cap Markings

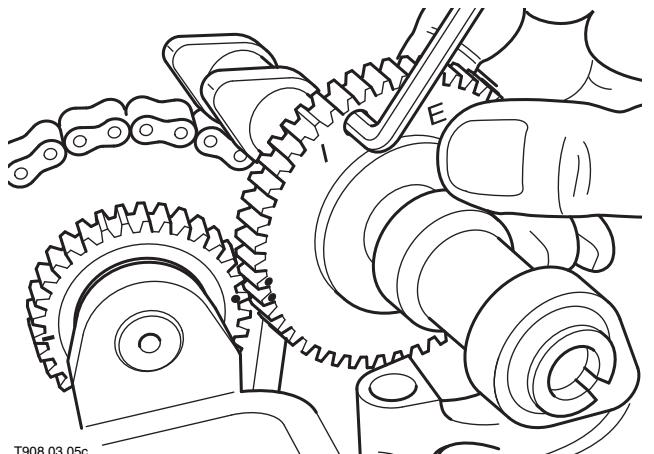
11. Evenly and progressively slacken the camshaft cap bolts by half-a-turn at a time until valve spring pressure is released from the caps.



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.

13. Lift the camshaft out of position.

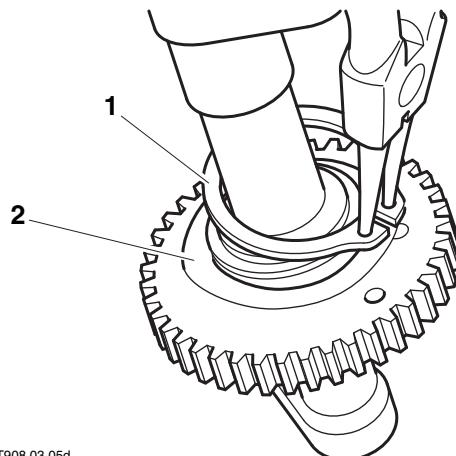


T908.03.05c

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**

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

Cylinder Head & Camshafts

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.

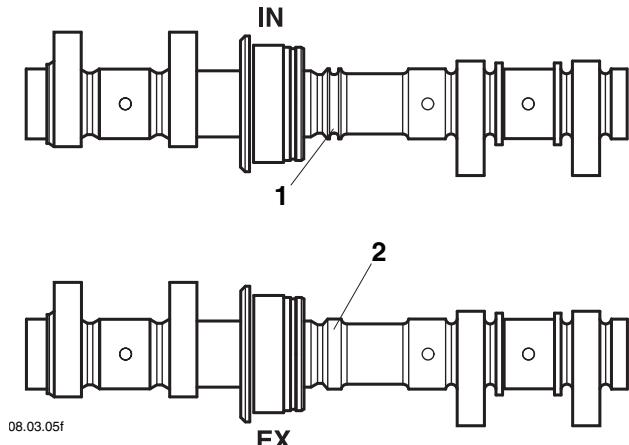
Camshaft bearing journal clearance

Standard	0.040 - 0.091 mm
Service limit:	0.12 mm

Installation

Note:

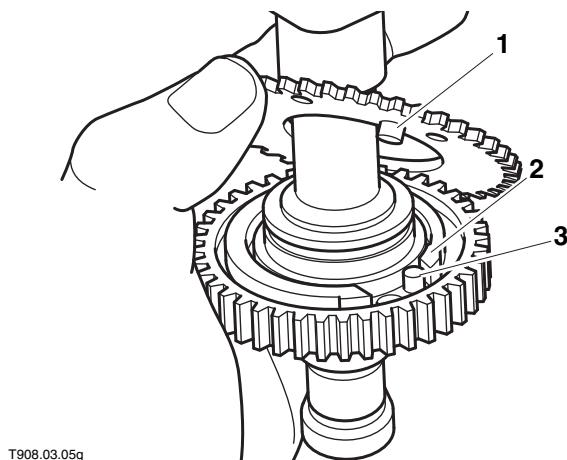
- The inlet and exhaust camshafts are different and are not interchangeable. The inlet camshaft has a groove in its machined surface whereas the exhaust camshaft has no groove.**



1. Inlet camshaft identification groove

2. Exhaust camshaft plain surface

- 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.

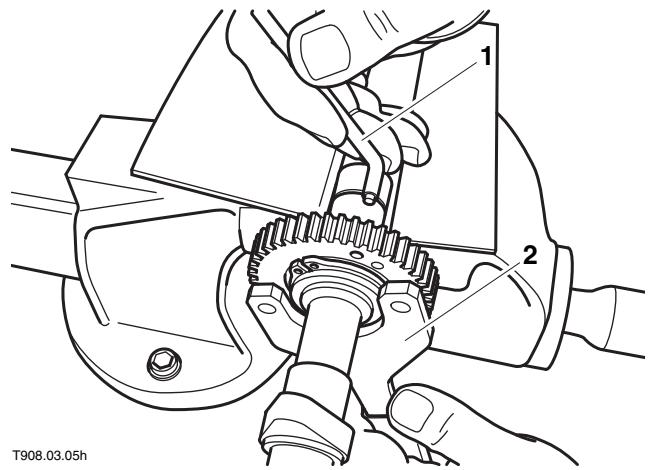


1. Backlash gear peg

2. Spring

3. Camshaft gear peg

- 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.



1. Locking pin

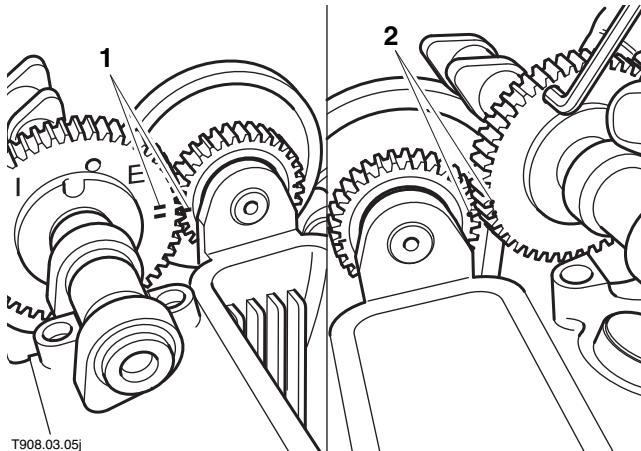
2. Wrench

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

Cylinder Head & Camshafts

Note:

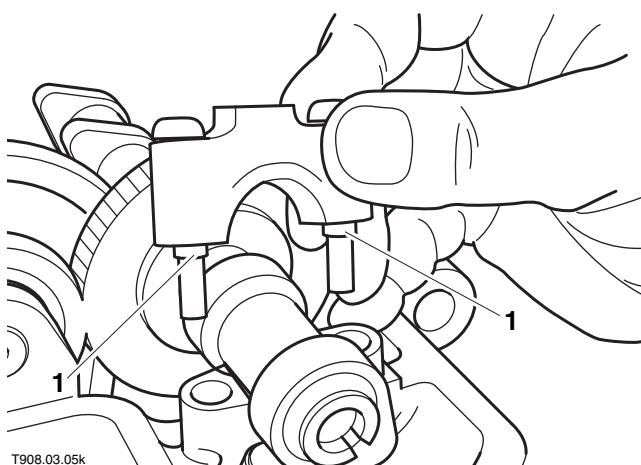
- Ensure the timing marks are correctly aligned before proceeding.



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).

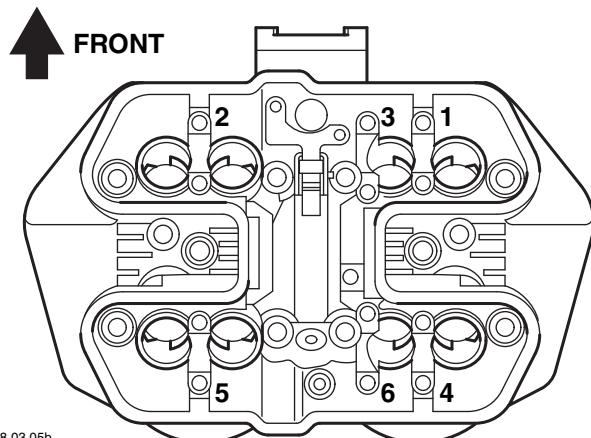


1. Locating dowels

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

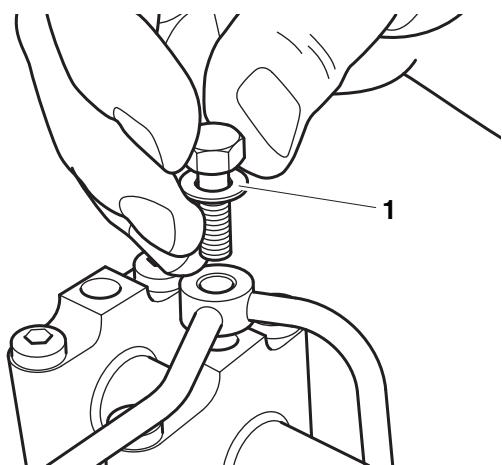
Caution

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.



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**.



1. Sealing washer

16. Refit the camshaft cover (see page 3-5).
17. Refit the alternator cover (see page 17-35).

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:

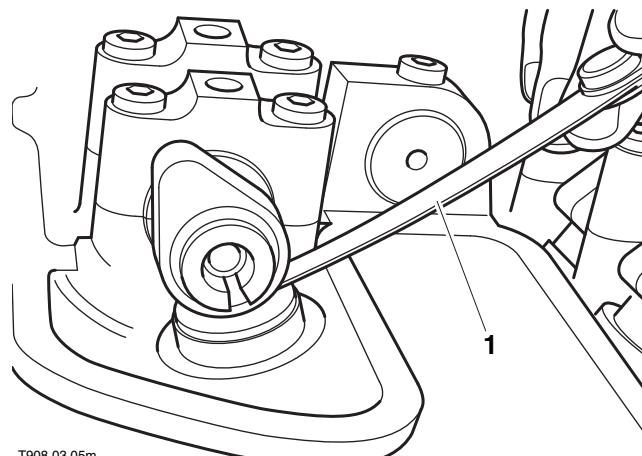
- Valve clearance adjustment must be carried out with the engine cold.**

1. Remove the camshaft cover (see page 3-4).
2. Remove the alternator cover from the right hand side of the crankcase (see page 17-34).
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



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 (see page 3-5) and alternator cover (see page 17-35).

Adjustment

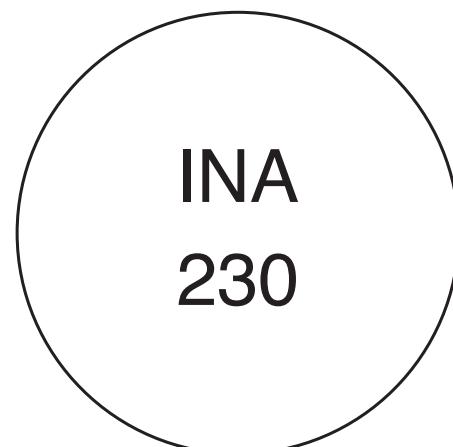
Note:

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

1. Remove the camshaft(s) as necessary (see page 3-5).
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).**



**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) (see page 3-9).
7. Once adjustment is complete, rotate the crankshaft through a couple of rotations to settle all shims in position then recheck the valve clearances.

Cylinder Head & Camshafts

Cam Chain Tensioner

Removal

Caution

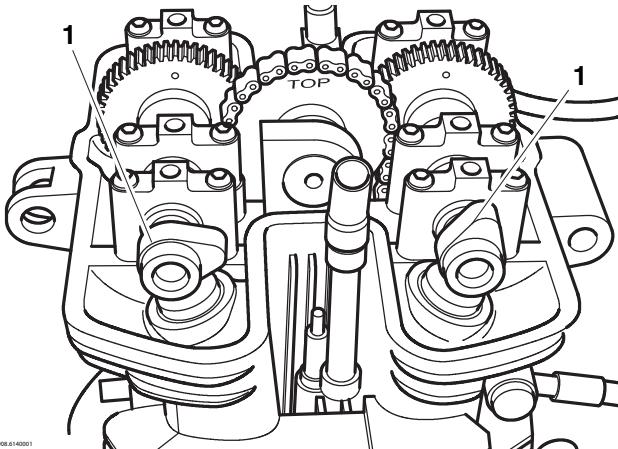
Never rotate the crankshaft whilst the cam chain tensioner is removed. If the tensioner is not fitted, the cam chain could jump on its sprockets which could allow the valves to contact the pistons, resulting in serious engine damage.

Caution

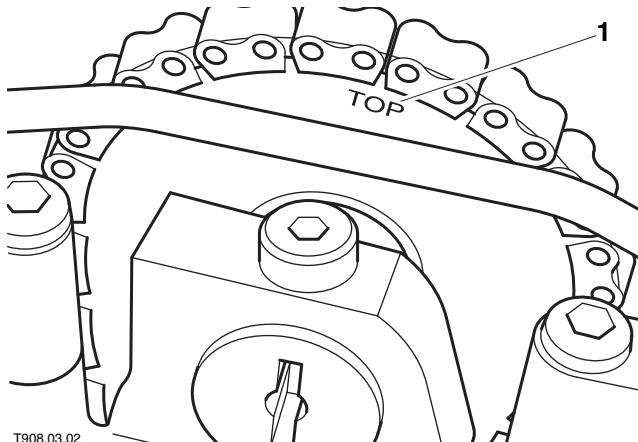
The tensioner is of the spring-loaded type and has a non-return mechanism. If the tensioner mounting bolts are slackened, the tensioner assembly must be removed and its plunger reset before being refitted. Never slacken the mounting bolts slightly and retighten them without resetting the plunger. This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

1. Remove the camshaft cover (see page 3-4).
2. Remove the alternator cover from the right hand side of the crankcase (see page 17-34).

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.

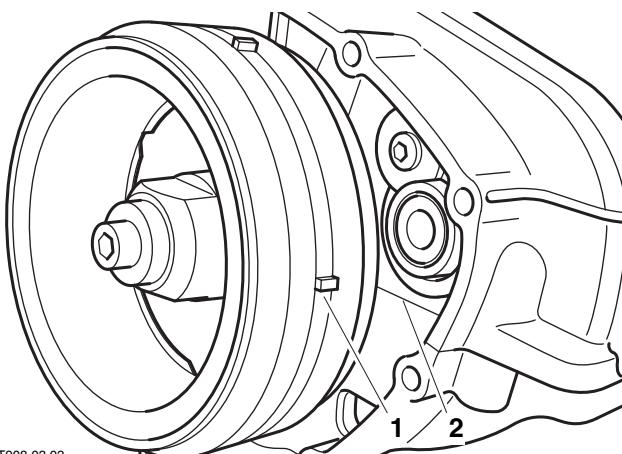


1. Right hand cylinder camshaft lobe positions



1. Camshaft drive gear TOP mark

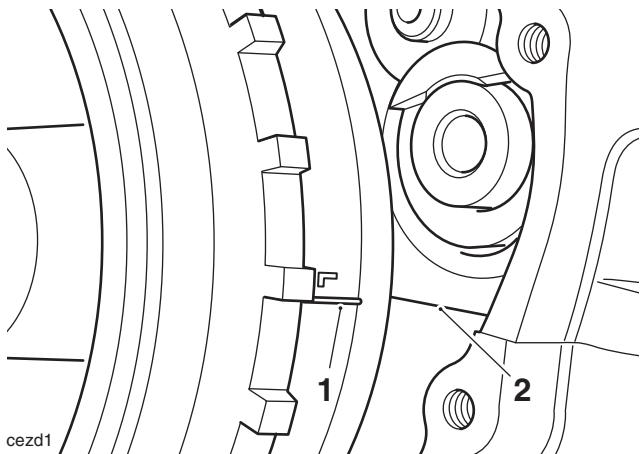
4. **Carburettor models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



1. Alternator 'L' line

2. Crankcase joint

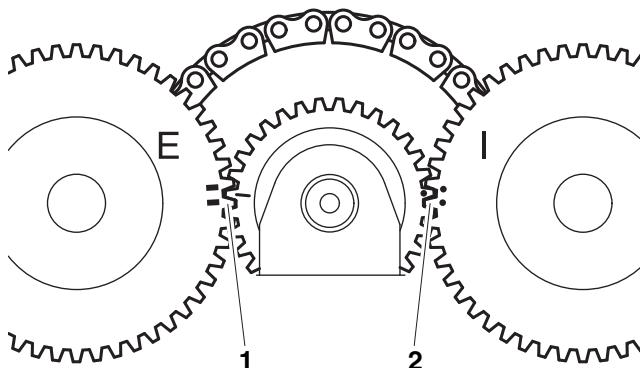
5. **Fuel Injection (EFI) models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



1. Alternator rotor 'L' line

2. Crankcase joint

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 in between the lines on the exhaust camshaft gear and its dot should be positioned in between the dots on the inlet camshaft gear.



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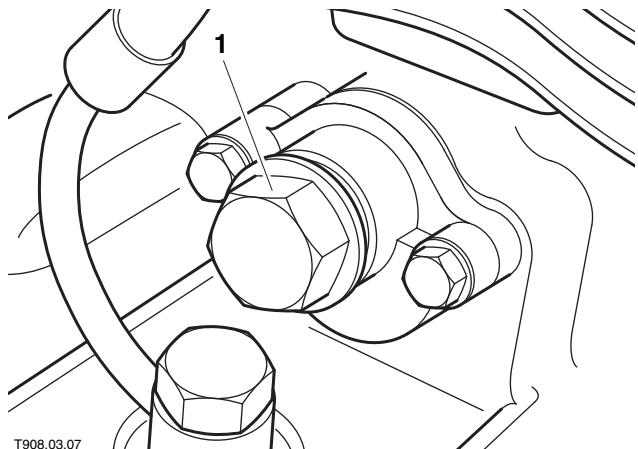
1. Exhaust camshaft timing marks
2. Inlet camshaft timing marks



Warning

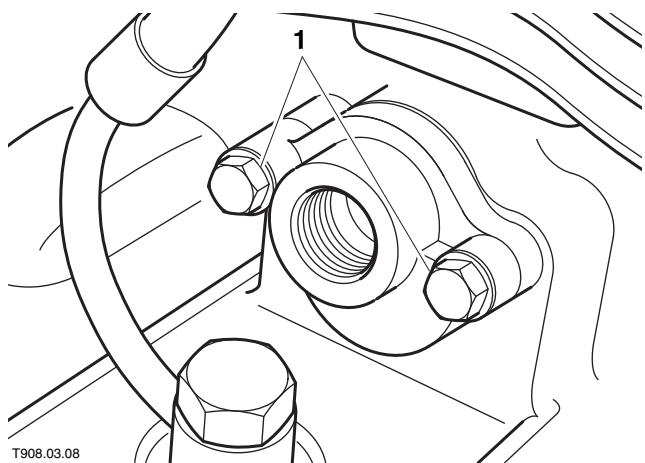
The cam chain tensioner centre bolt is under spring tension. Always wear hand, eye and face protection when unscrewing the centre bolt. Take great care to minimise the risk of personal injury and loss of components.

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



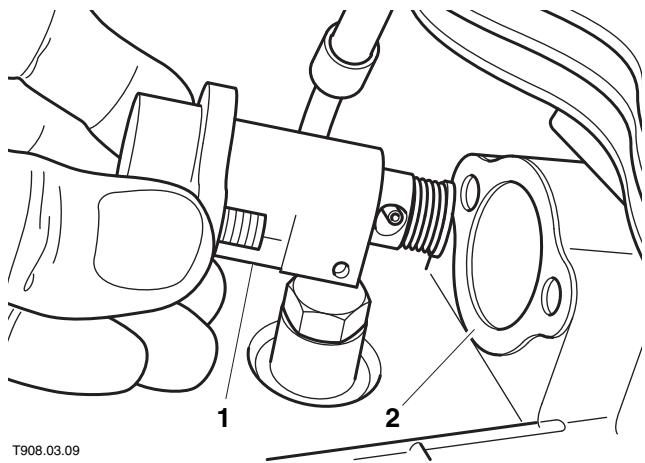
1. Tensioner centre bolt

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



1. Tensioner body bolts

9. Remove the tensioner body and gasket.



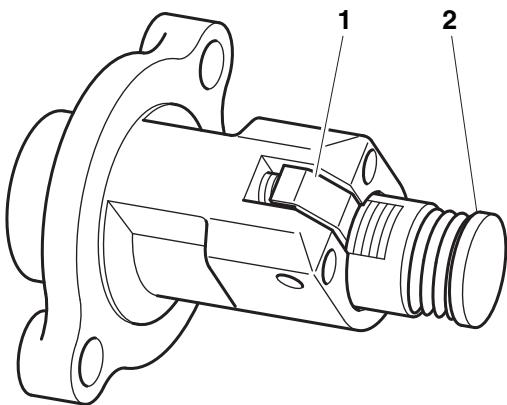
1. Tensioner body

2. Gasket

Cylinder Head & Camshafts

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

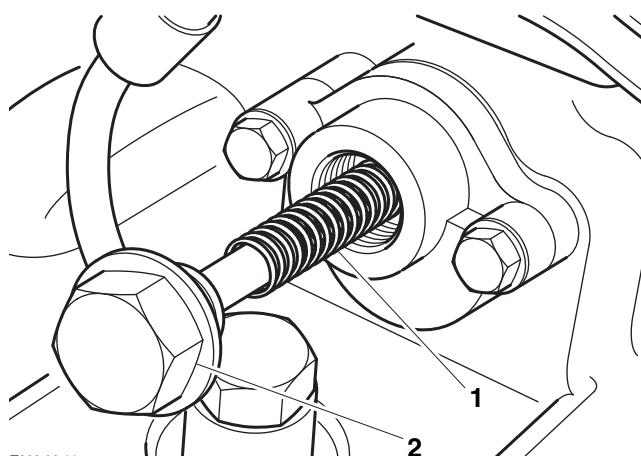
The cam chain tensioner centre bolt is under spring tension. Always wear hand, eye and face protection when fitting the centre bolt. Take great care to minimise the risk of personal injury and loss of components.

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**.



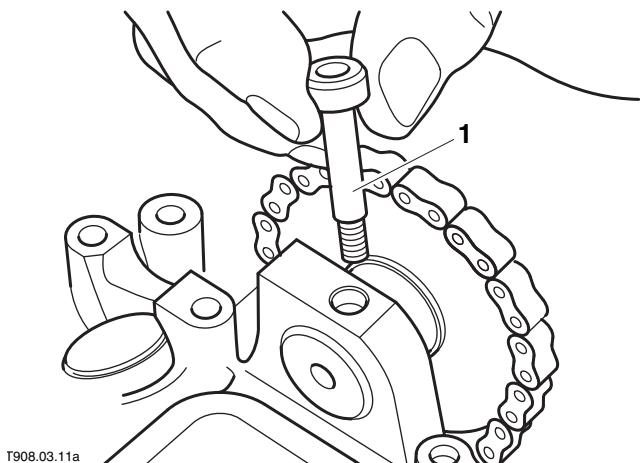
1. Spring
2. Centre bolt

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 (see page 3-5) and alternator cover (see page 17-35).

Camshaft Drive Gear

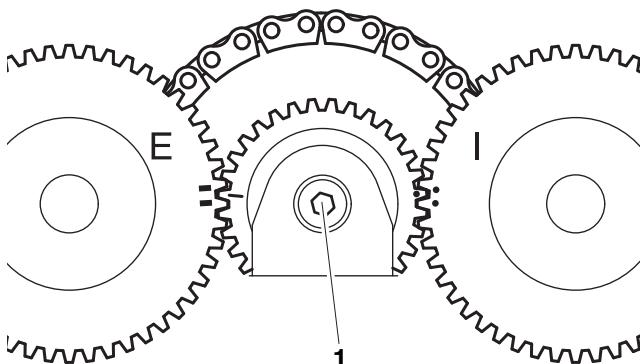
Removal

1. Remove the camshafts (see page 3-5).
2. Remove the cam chain tensioner (see page 3-12).
3. On models with engine numbers up to 186916, remove the drive gear shaft bolt from the top of the cylinder head.



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.



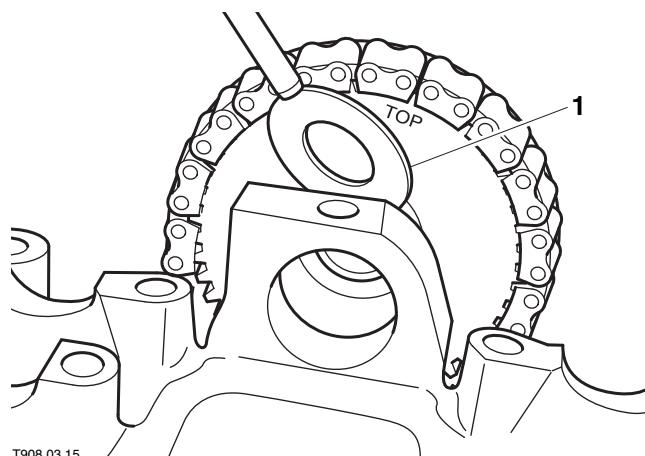
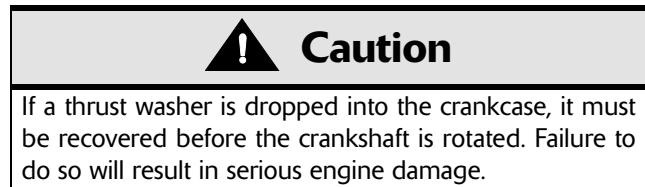
T908.03.04

- 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.



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.

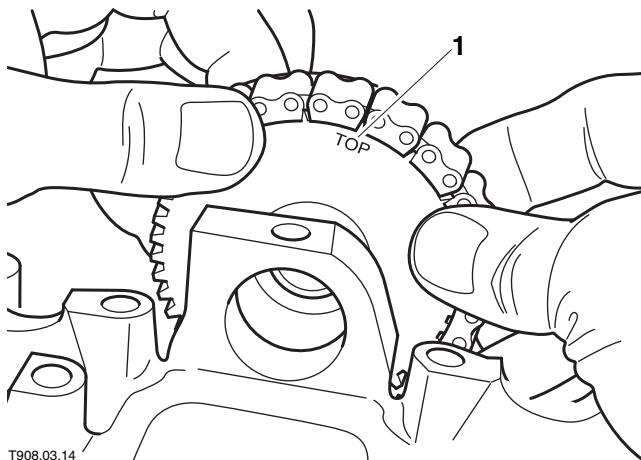
Inspection

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.

Cylinder Head & Camshafts

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.

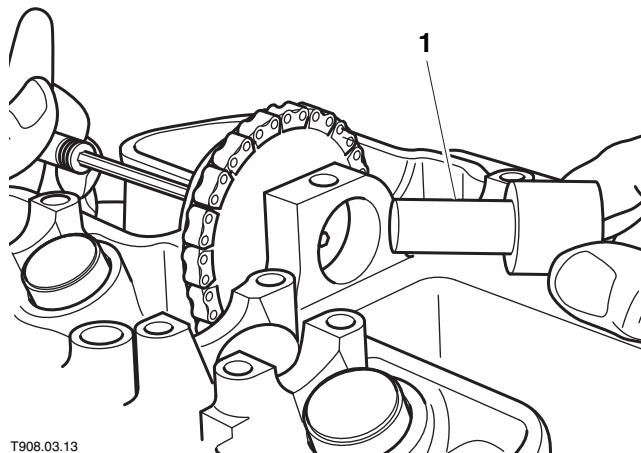


1. Drive gear TOP mark

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 (see page 3-14) and the camshafts (see page 3-9).

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 (black) lead first.
 - Remove fuel tank, exhaust system, carburettors/throttle bodies and the secondary air injection system control valve (see fuel system & exhaust section).
1. Remove the camshafts (see page 3-5), cam chain tensioner (see page 3-12) and the camshaft drive gear (see page 3-15).
 2. Lift out the tappet buckets complete with shims.

Note:

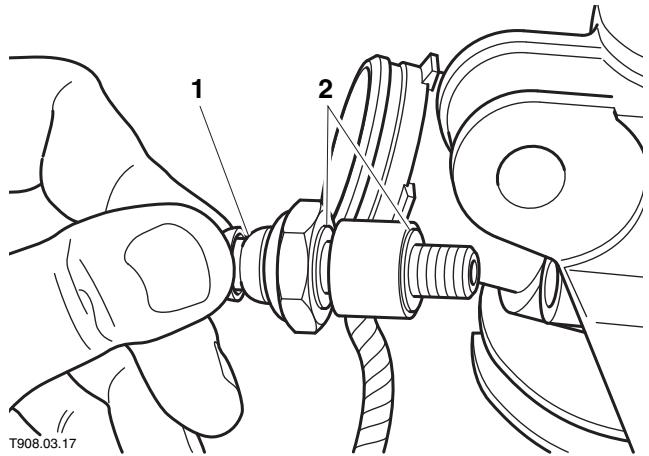
- **Store all tappet buckets and shims in such a way that ensures they will be refitted in their original locations. Interchanging of the buckets and shims will upset the valve clearances.**



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.

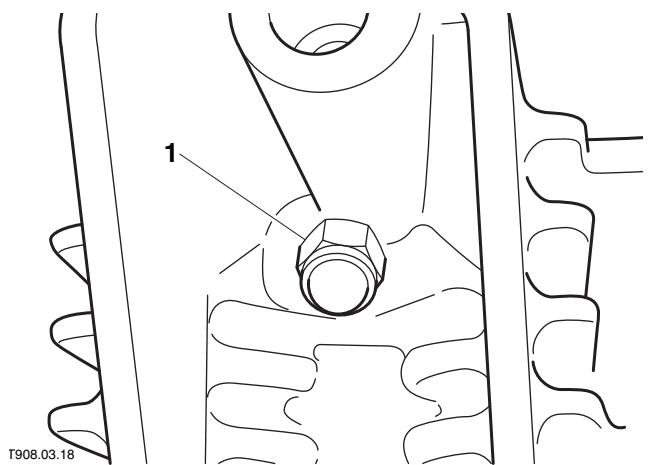
5. Unscrew the low oil pressure warning light switch and disconnect the oil feed pipe from the rear of the cylinder head. Recover the sealing washers and discard them.



1. Low oil pressure warning light switch

2. Sealing washers

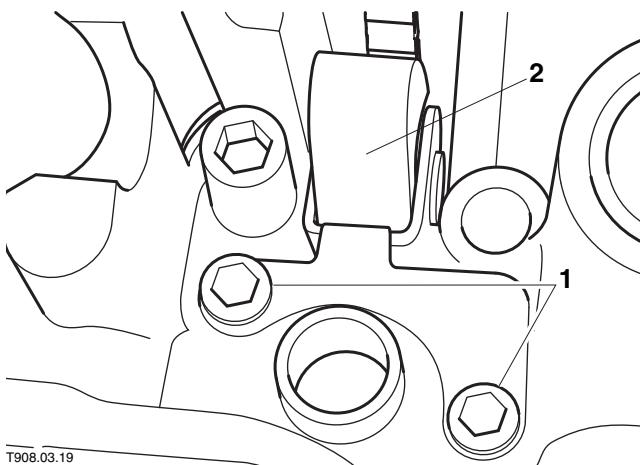
6. Unscrew the banjo bolts securing the oil cooler feed pipes to the cylinder head. Recover the sealing washers and discard them.
7. Remove the nut and washer and lift out the cam chain tensioner blade from the rear of the cylinder head.



1. Tensioner blade nut

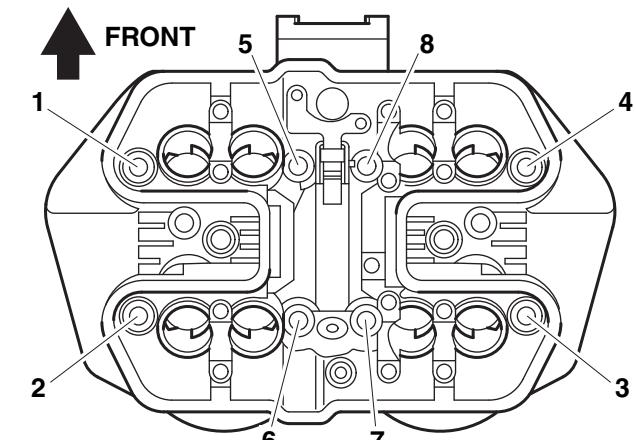
Cylinder Head & Camshafts

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



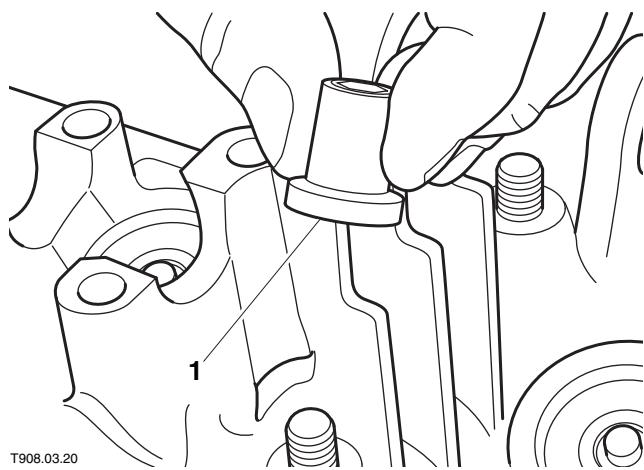
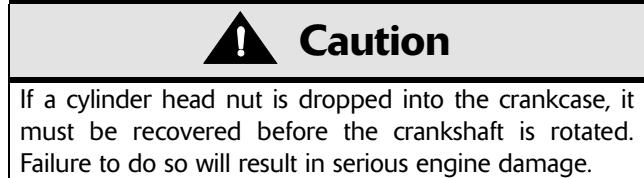
- Guide blade bolts**
- Guide blade**

- Unscrew the nuts securing the mounting bracket to the rear of the cylinder head and the frame. Withdraw the bolt and remove the bracket.
- Unscrew the nut and withdraw the engine front upper engine mounting bolt from the cylinder head.
- Evenly and progressively slacken the cylinder head nuts in the order shown below until all are loose.



Cylinder Head Nut Slackening Sequence

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



- Cylinder head nut**

- Carefully break the seal of the head gasket.

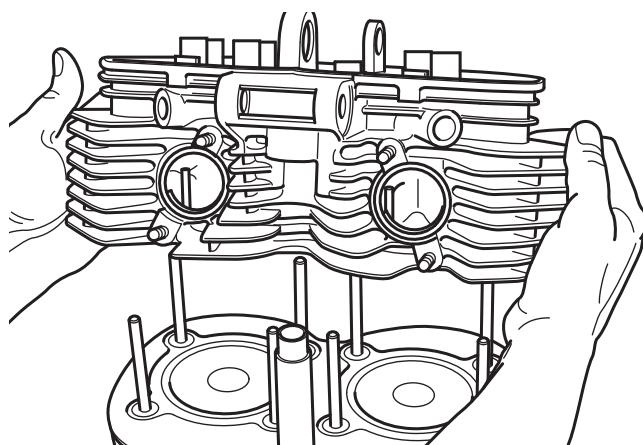


Note:

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

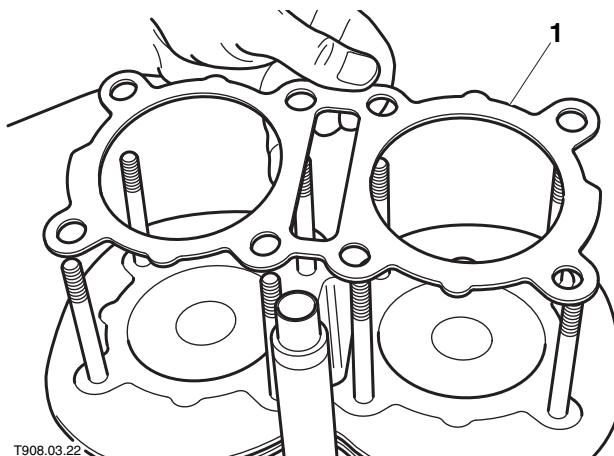
Note:

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



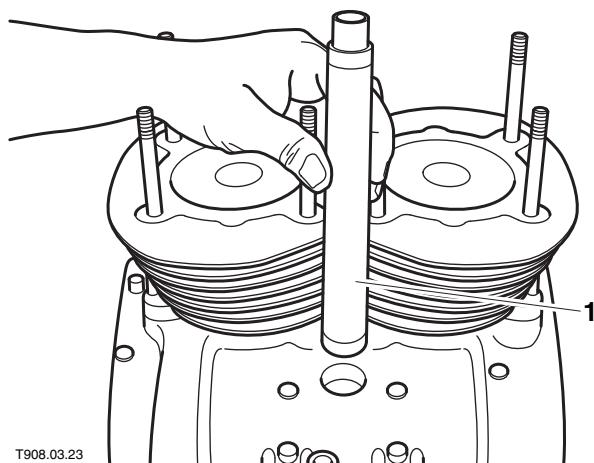
Removing The Cylinder Head

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

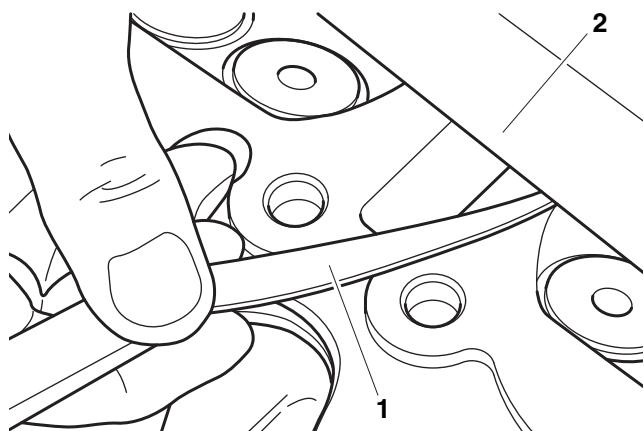
It is strongly recommended that, when the cylinder head is removed, the barrels are also removed in order to renew the base gasket. For details, refer to the barrels and pistons section.

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

Inspection

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

- 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.



- Feeler gauge
- Straight edge

Cylinder head gasket face warpage

Standard	Less than 0.03 mm
Service limit	0.07 mm

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

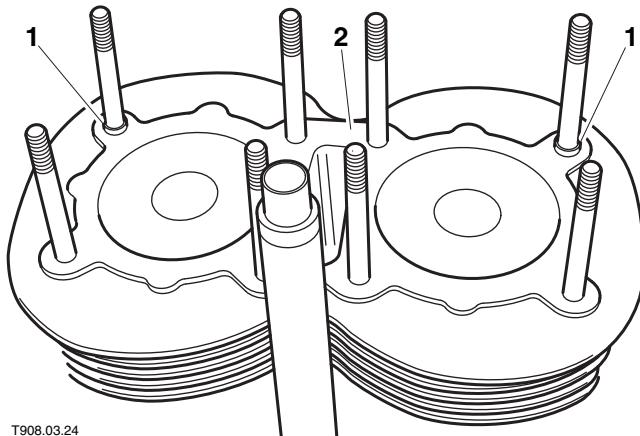
Installation

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

Cylinder Head & Camshafts

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

- 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.
- 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.

- 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 all three stages a torque wrench of known and accurate calibration must be used.

- Tighten the cylinder head nuts in the sequence shown to **20 Nm**.
- Tighten the cylinder head nuts in the sequence shown to **26 Nm**.
- Finally tighten the cylinder head nuts in the sequence shown to **28 Nm**, followed by a further **120°**.

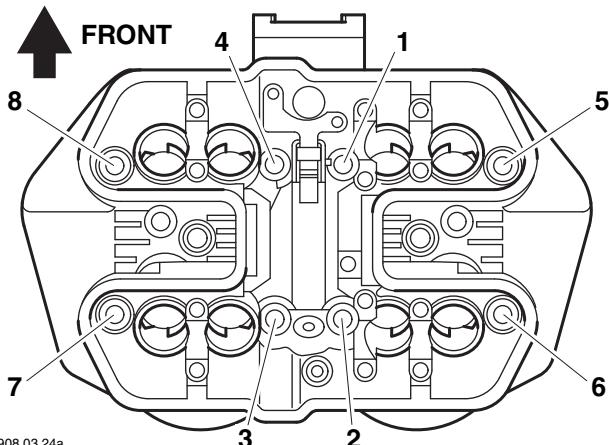
Note:

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



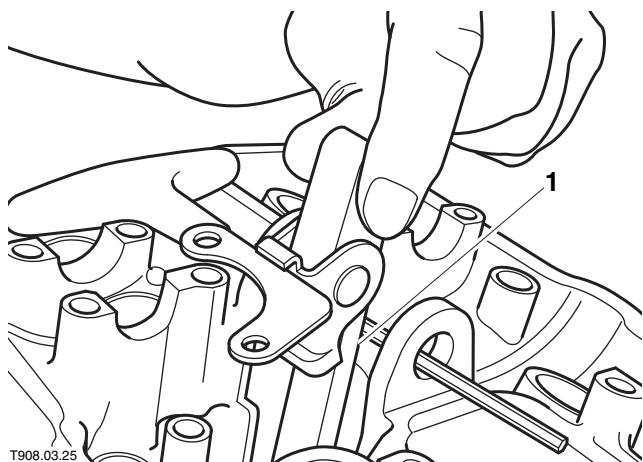
Caution

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

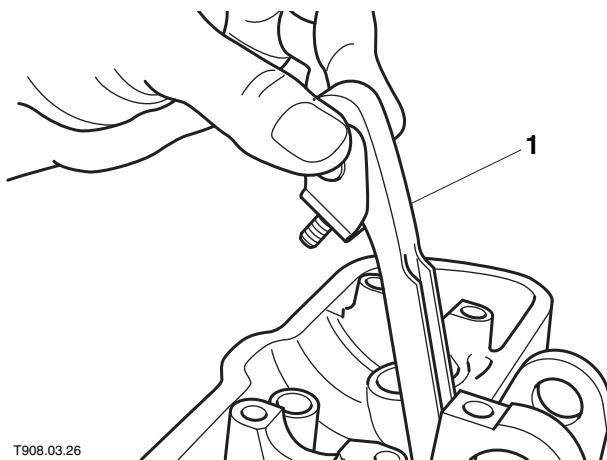
- Fit the engine front upper mounting bolt and nut and tighten to **80 Nm**.
- Refit the cylinder head to frame mounting brackets and fit the bolts and nuts. Tighten the bracket to cylinder head bolt to **80 Nm** and the bracket to frame bolt to **80 Nm**.
- Fit the cam chain guide blade to the front of the cylinder head and tighten its retaining bolts to **10 Nm**.



1. Guide blade

- Fit the cam chain tensioner blade to the rear of the cylinder head.
- Thoroughly clean the washer, the threads of the nut and the threads of the camshaft drive chain tensioner blade.

12. Apply one drop of ThreeBond 1305 to the threads of the nut.
13. Fit the washer and nut to the blade and tighten to **10 Nm**.



T908.03.26

1. Tensioner blade

14. 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 **25 Nm**.
15. 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.
16. 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.**
17. Refit the camshaft drive gear (see page 3-16), the cam chain tensioner (see page 3-14) and the camshafts (see page 3-9).
 18. Fit the spark plugs and tighten to **20 Nm**.
 19. Refit all components removed for access.

Valves

Removal

Note:

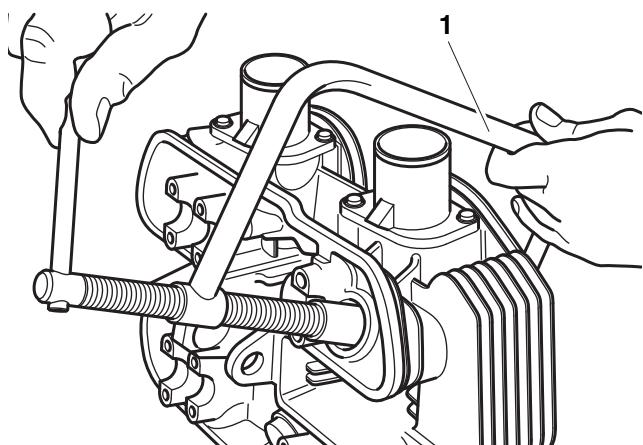
- **Store each valve and its associated components together in such a way that ensures all components are refitted in their original locations.**

1. Remove the cylinder head (see page 3-17). 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.



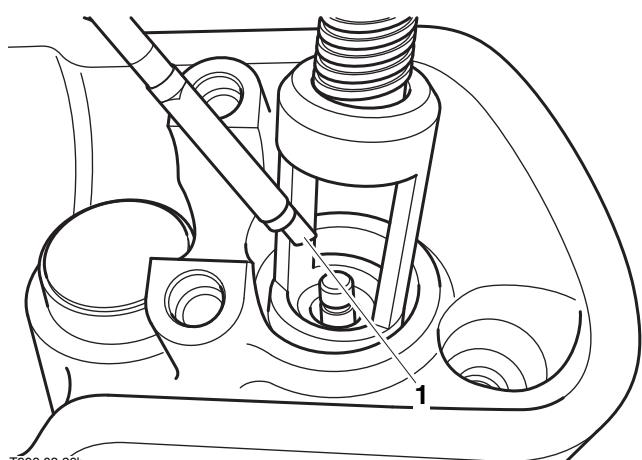
Warning

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

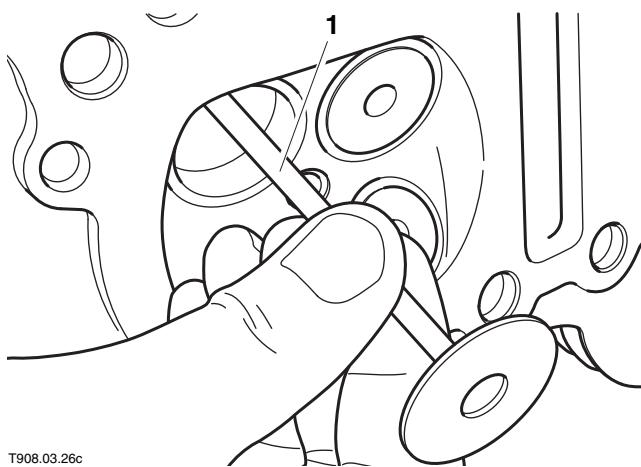
3. With the collets removed, carefully release the spring compressor.



1. Collet (on the end of a magnet)

Cylinder Head & Camshafts

- Lift off the spring retainer, valve spring and spring seat.
- Slide the valve out of its guide. If necessary, deburr the valve before removal.



T908.03.26c

1. Valve

- Remove the valve stem seal from the guide.

Inspection

- 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.
- 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

- 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

- 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

- 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

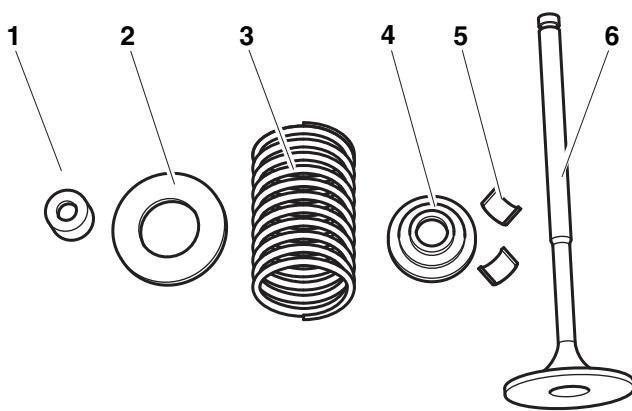
Standard	1.27 to 1.56 mm
Service limit	1.56 mm

- 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

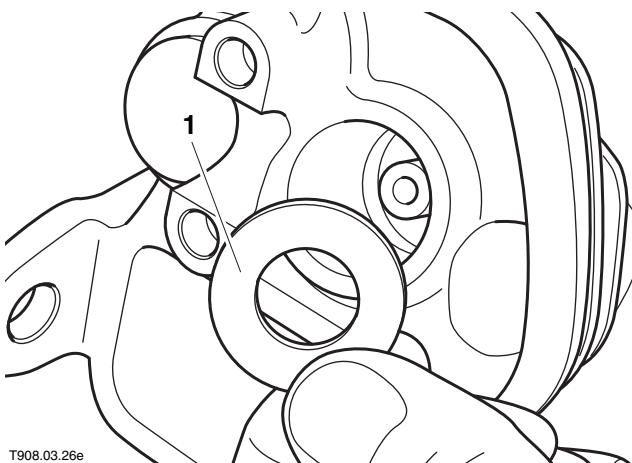
1. Locate the new valve stem seal on the end of the valve guide. Press the seal fully onto the guide, taking care not to damage its sealing lip or ring.



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.

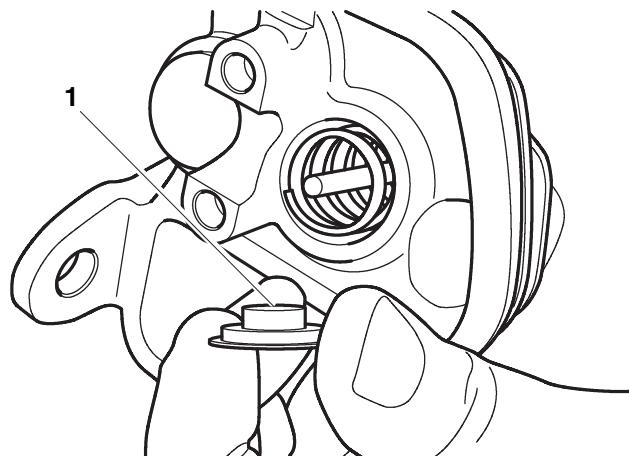
2. Apply a thin coat of molybdenum disulphide grease to the valve stem.
3. Install the valve into the valve guide, easing it gently through the seal.
4. Fit the spring seat.



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.

8. Refit the cylinder head (see page 3-19).

Cylinder Head & Camshafts

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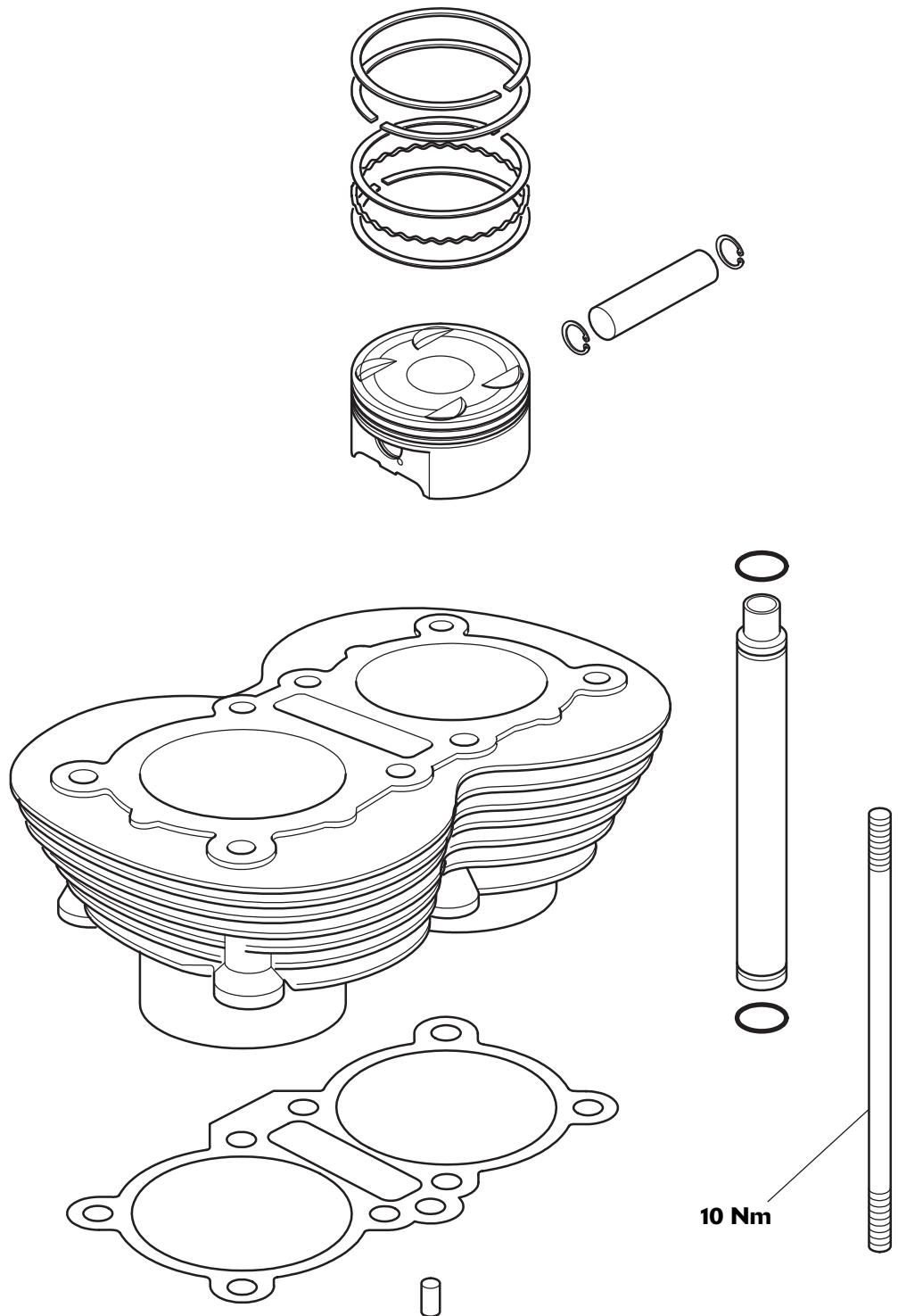
4 Barrels & Pistons

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Barrels & Pistons

Exploded View - Barrels and Pistons



Barrels

Removal

1. Remove the cylinder head (see page 3-17).
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.

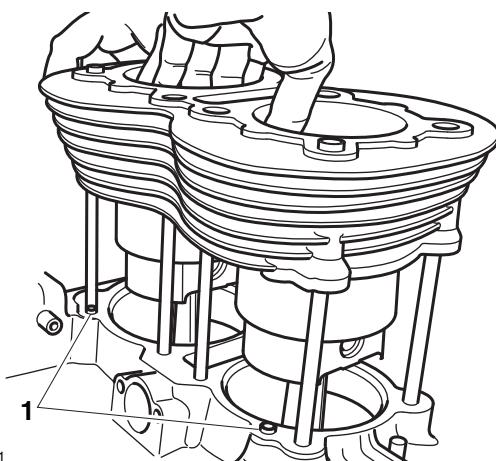
Note:

- **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.



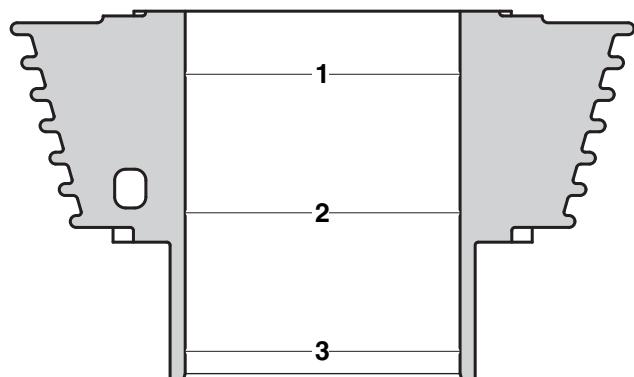
T908.04.01

1. Locating dowels

5. Remove the base gasket and discard it.

Inspection

6. 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 - 790 cc engines

Standard	85.991 to 86.009 mm
Service Limit	86.034 mm

Cylinder bore diameter - 865 cc engines

Standard	89.991 to 90.009 mm
Service Limit	90.034 mm

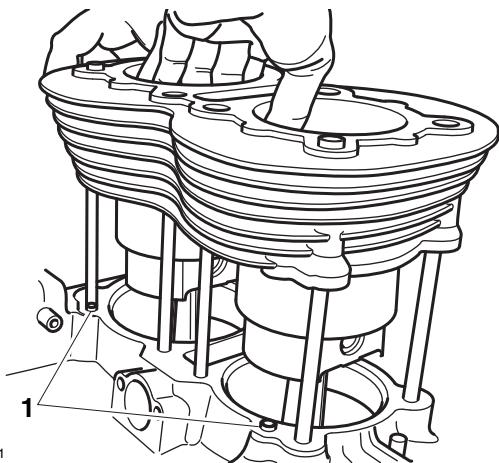
Note:

- Check the diameter at points 1, 2 and 3.
- If any readings are outside the service limit, replace the barrels and pistons.

Barrels & Pistons

Installation

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.



T908.04.01

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.

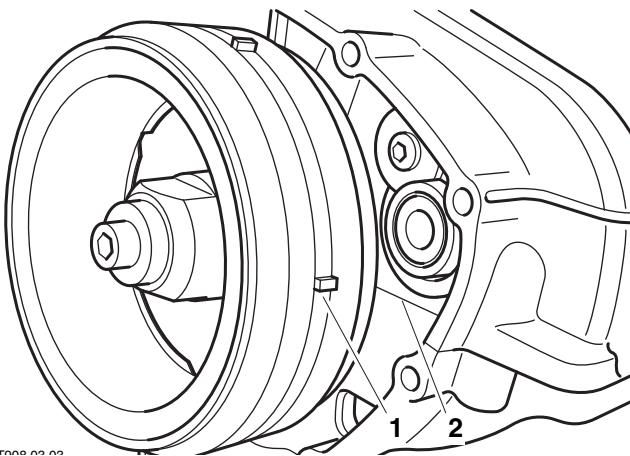
8. Ease the barrels carefully down over the pistons whilst guiding the piston rings into the base of the cylinder bores.



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.

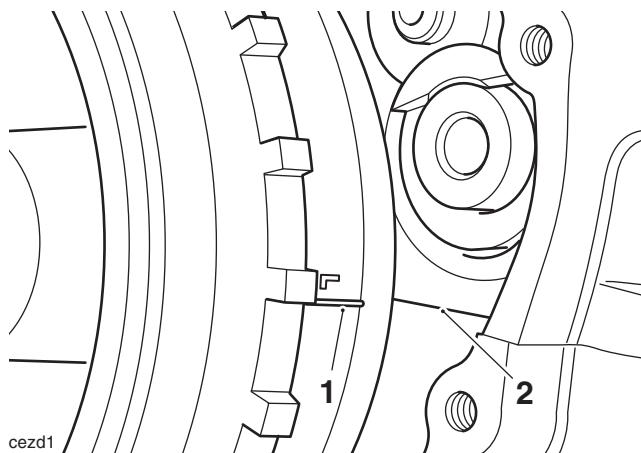
9. Slide the barrels fully down and locate on the dowels.
10. **Carburettor models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



T908.02.02
1. Alternator rotor timing mark 'L'

2. Crankcase Joint

11. **Fuel Injection (EFI) models:** The alternator rotor has two timing marks, which are marked with the letters 'L' & 'R'. Align the timing mark 'L' on the alternator rotor with the front of the crankcase joint to bring the engine to its timing position.



cezd1
1. Alternator rotor timing mark 'L'

2. Crankcase joint

12. Refit the cylinder head (see page 3-19).

Pistons and Rings

Removal

1. Remove the barrels (see page 4-3).
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.

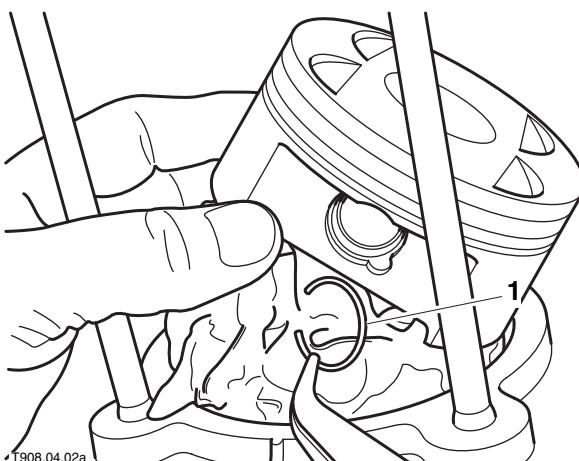
Note:

- 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.



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 any more 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:

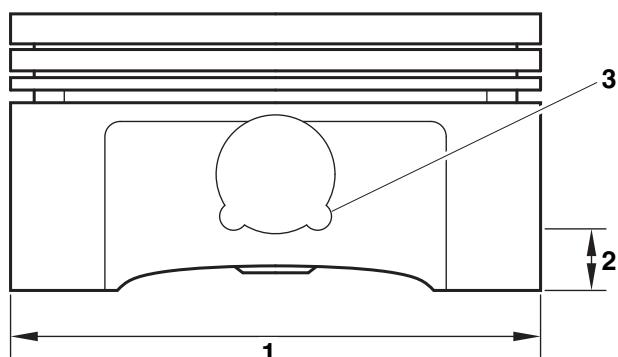
- The top and second compression rings are different and are not interchangeable (see installation).
- 9. Remove the oil control rings and expander.

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.



1. Piston outside diameter

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

3. Gudgeon pin bore

Barrels & Pistons

Piston outside diameter - 790 cc engines

Standard	85.975 to 85.990 mm
Service limit	85.935 mm

Piston outside diameter - 865 cc engines

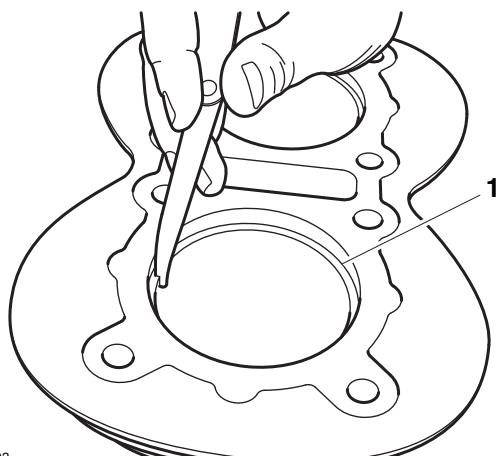
Standard	89.972 to 89.988 mm
Service limit	89.933 mm

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.**
 - Ease the piston ring into the top of the cylinder bore.
 - 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.
 - Remove the piston and measure the gap between the ends of the piston ring, using a feeler gauge.



T908.04.03

1. Checking piston ring (1) end gap

Piston ring end gap - 790 cc 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 - 865 cc 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 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).**



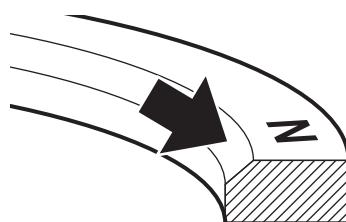
Caution

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

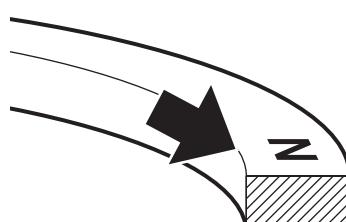
3. Fit the second compression ring carefully to the piston, ensuring its **N** (up to engine number 282963 (F2) or 273654 (F4)) or **2N** (from engine number 282964 (F2) or 273655 (F4)) mark is facing upwards.

Note:

- The second and top compression rings are different and are not interchangeable. 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.**



Top Ring



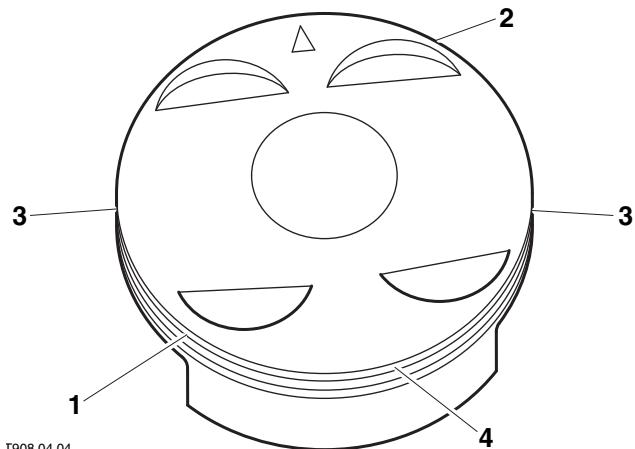
Second Ring (up to
engine number
282963 (F2)
or 273654 (F4))



Second Ring (from
engine number
282964 (F2)
or 273655 (F4))

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).



T908.04.04

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.

Barrels & Pistons



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.



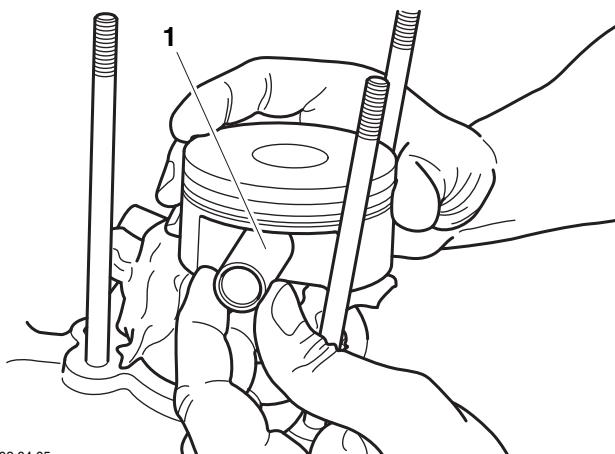
05.25-2

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.

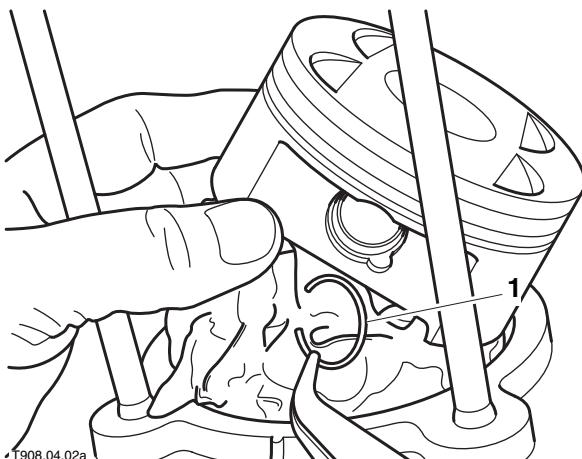
Note:

- 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.



1. Circlip

12. Install the remaining piston then refit the barrels (see page 4-4).



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.

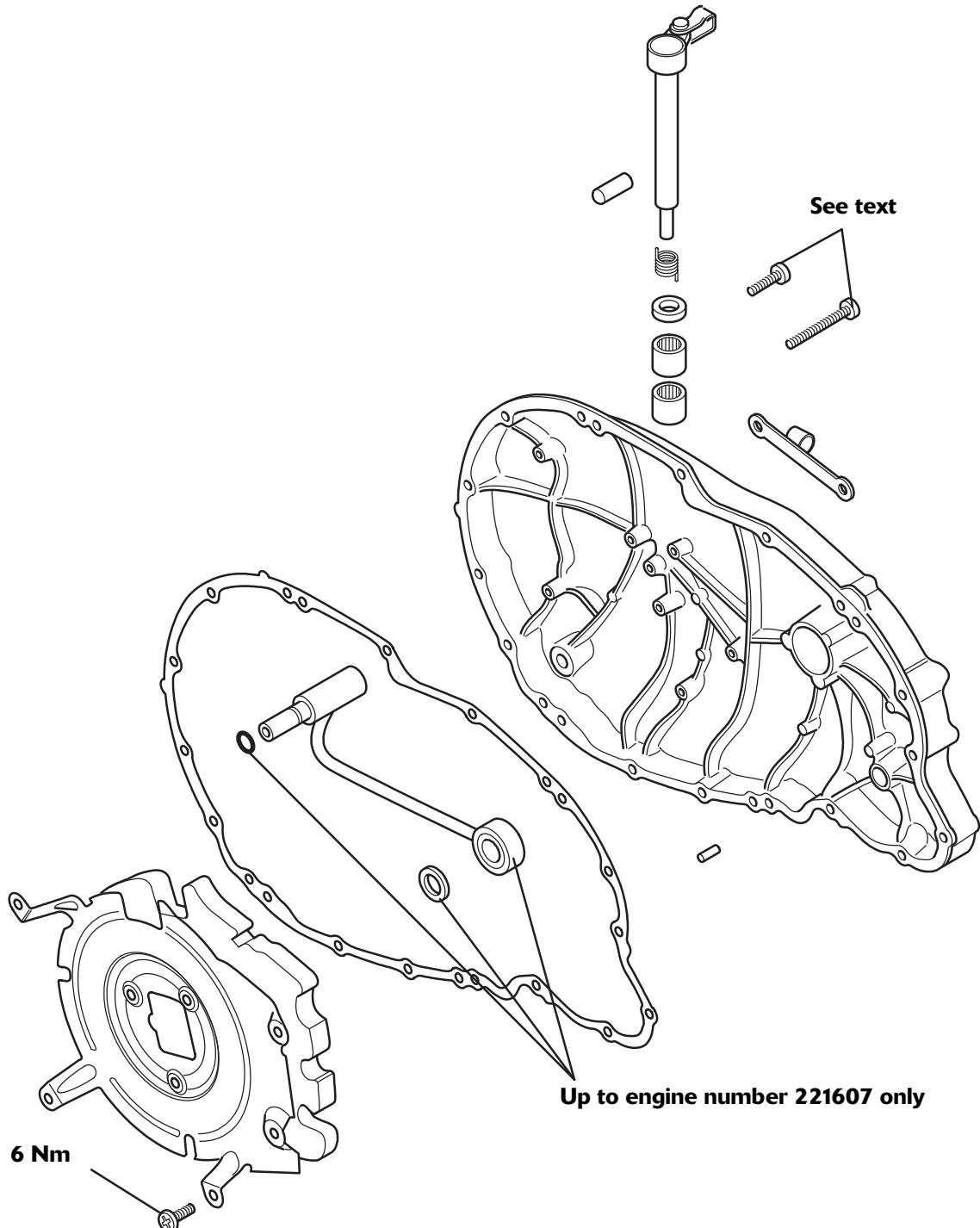
5 Clutch

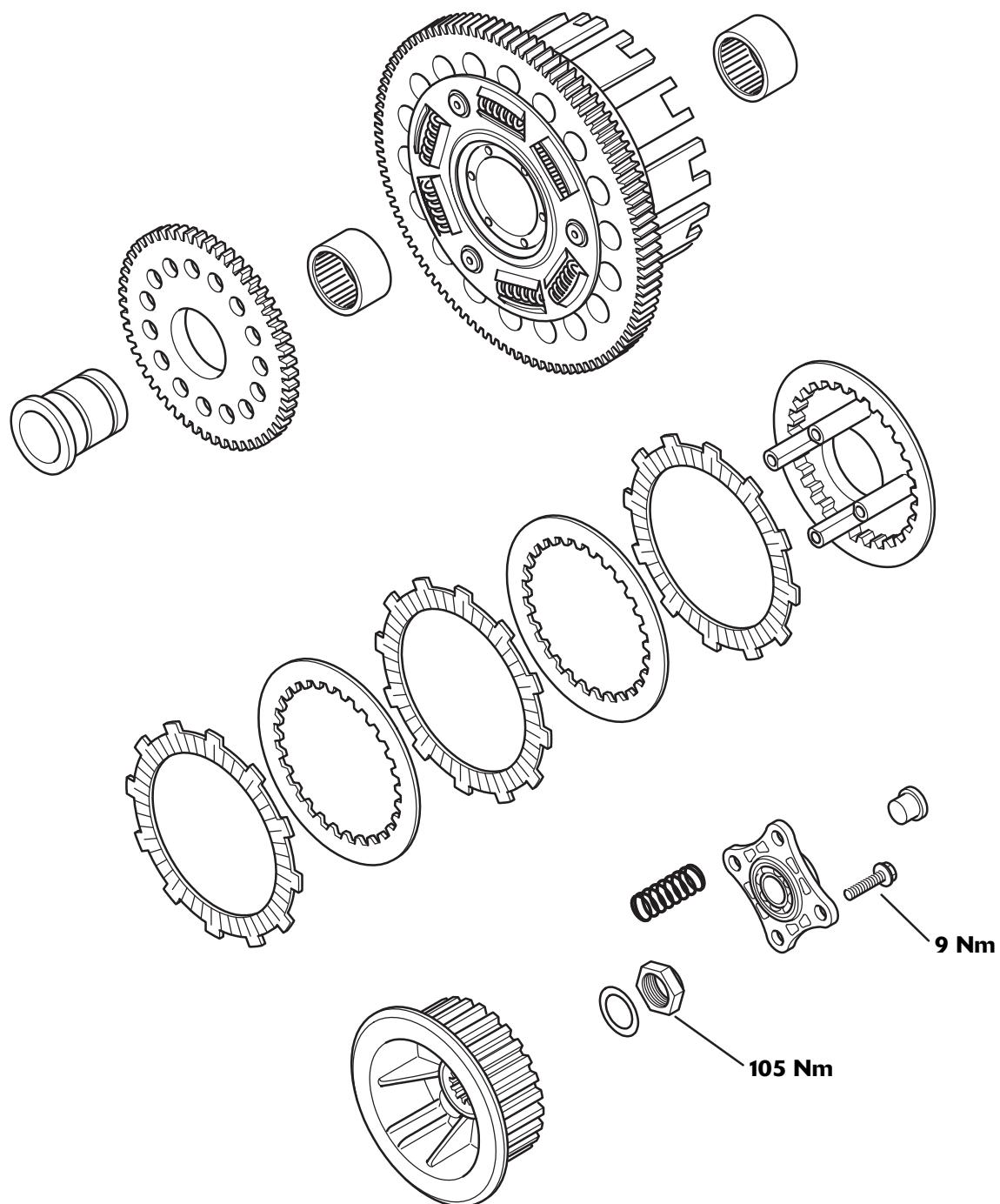
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Clutch

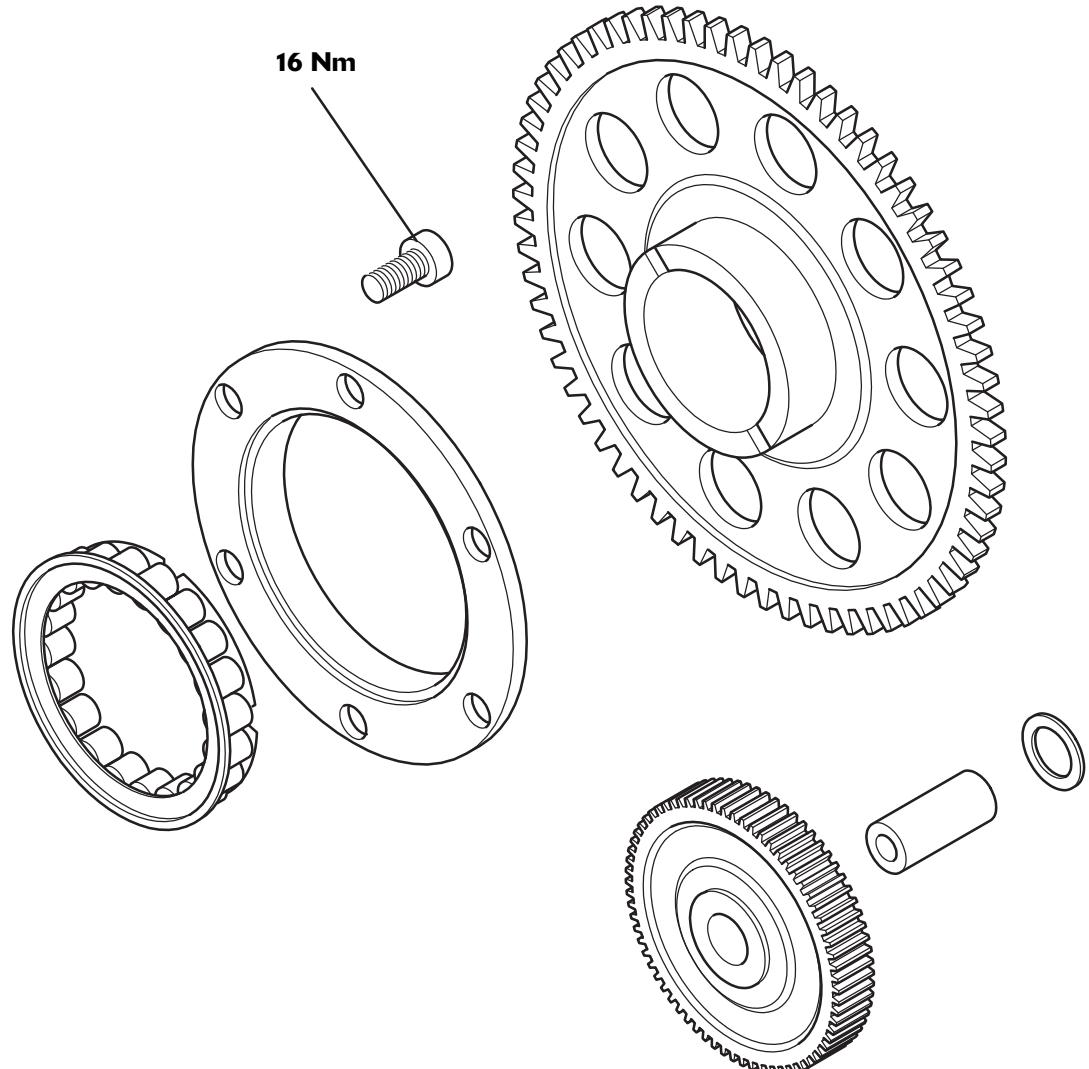
Exploded View - Clutch Cover and Release Mechanism



Exploded View - Clutch Assembly

Clutch

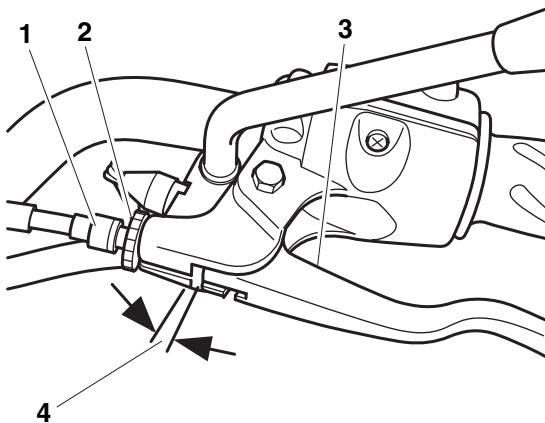
Exploded View - Starter Drive Components



Clutch Cable

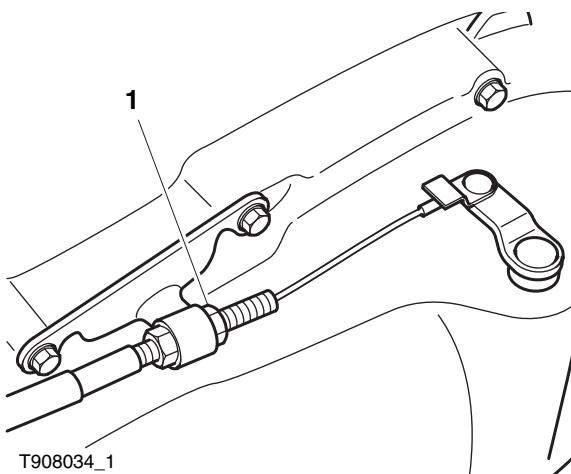
Adjustment

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



1. **Upper adjuster**
2. **Adjuster lock nut**
3. **Lever**
4. **Free play measurement**

2. To adjust the cable, slacken the lock nut and rotate the upper adjuster. Once the free play setting is correct, securely tighten the lock nut.
3. If there is insufficient adjustment available, screw the upper adjuster fully into the bracket then slacken the lower adjuster lock nut. Position the lower adjuster nut so that all but a small amount of free play is removed from the cable then securely tighten the lock nut. Carry out final adjustment with the upper adjuster.



1. **Lower adjuster**

Removal

1. Slacken the lock nut and screw the upper adjuster fully into the lever mounting bracket.
2. Slacken the lower adjuster lock nut and back off the adjuster nut to give maximum free play 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 lock nut 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 free play is present in the cable then securely tighten the lock nut.
6. Operate the clutch lever several times to settle the cable in position then adjust the cable free play using the upper adjuster (see page 5-5).

Clutch

Clutch Cover

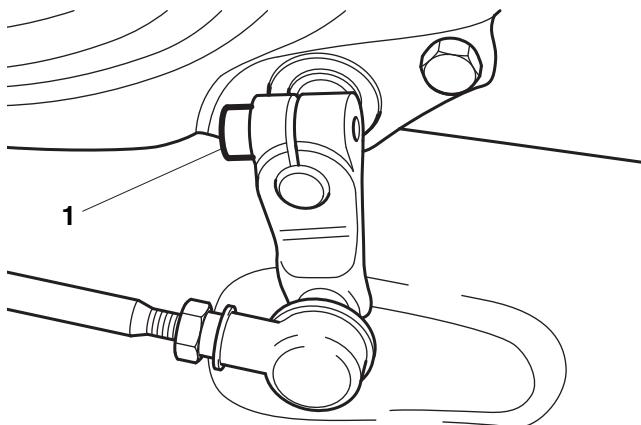
Removal



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) lead first.
3. Drain the engine oil (see page 9-9). 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.

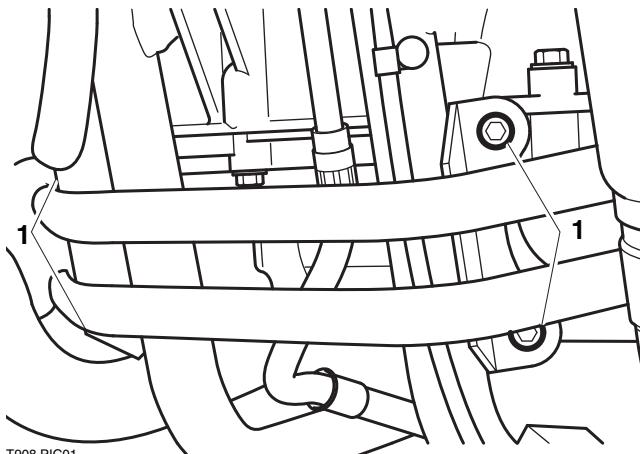


T908.03.06

1. Gear change lever

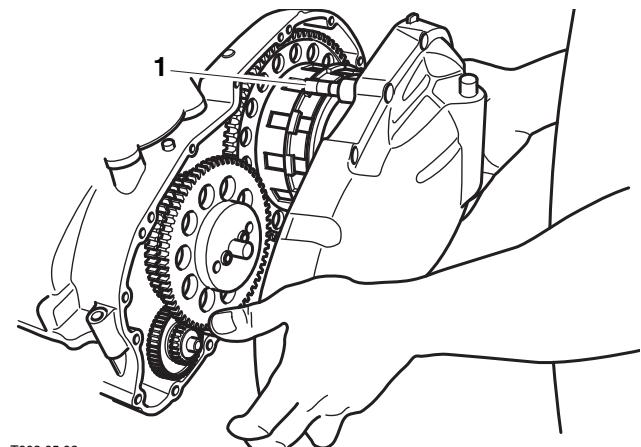
5. Remove the left hand silencer as described in the relevant fuel system section.
6. **America and America LT from VIN 611105 only (except VIN 611134):** Remove the footboard assemblies (see page 16-31).

7. Release the foot control mounting bar from the frame. Taking care not to bend the rear brake hose, manoeuvre 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

8. Detach the lower end of the clutch cable from the release arm (see clutch cable removal).
9. Disconnect the crankcase breather hose from its union on the top of the crankcase.
10. Slacken and remove the clutch cover retaining bolts along with the cable mounting bracket.
11. 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.



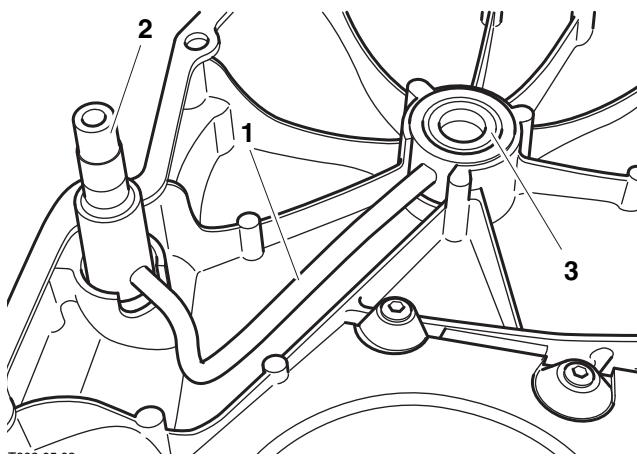
T908.05.02

1. Breather pipe

12. Remove the clutch cover gasket and discard it.

Inspection

- 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

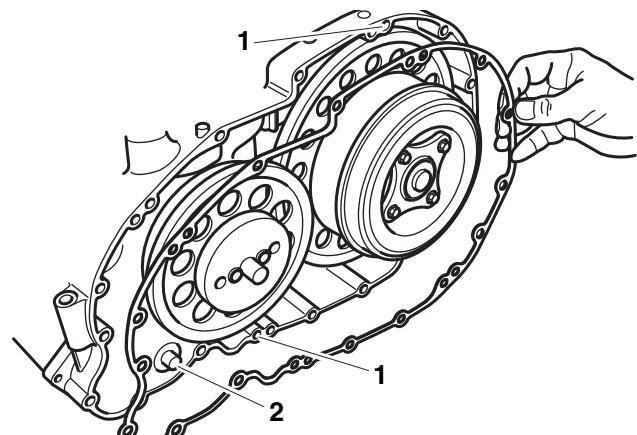
2. O-ring

3. Seal

- 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

- Ensure the clutch cover and crankcase mating surfaces are clean and dry.
- Check the clutch release mechanism components are correctly installed.
- Ensure the washer is in position on the starter idler gear shaft.
- Fit a new clutch cover gasket ensuring that the locating dowels are correctly in place.

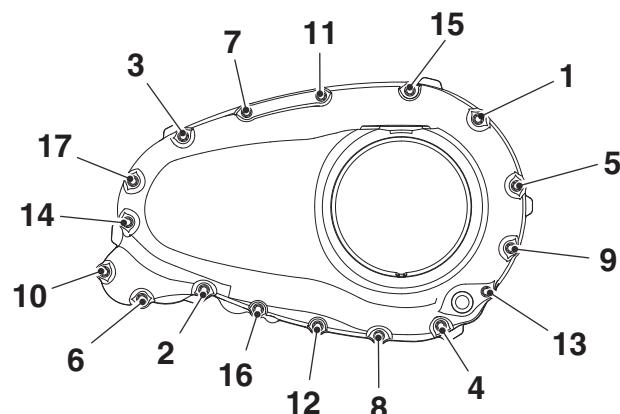


1. Locating dowels

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.
- 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.
- Install the clutch cover bolts in their original locations, ensuring the clutch cable mounting bracket is correctly positioned.
- Tighten bolts 1 to 17 in the sequence shown below to **10 Nm**.
- Re-tighten bolts 1 and 2 to **10 Nm**.



Clutch Tightening Sequence

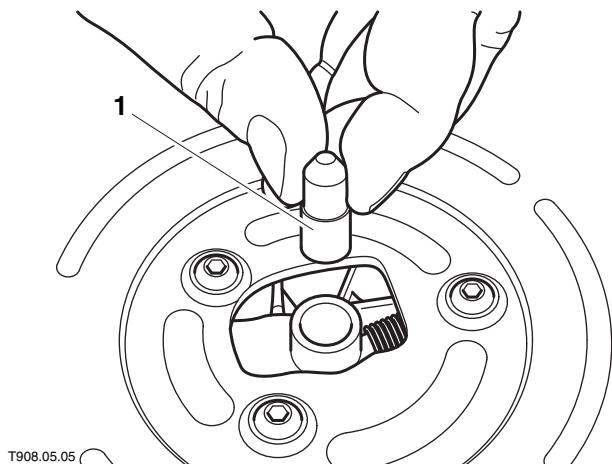
- Reconnect the crankcase breather hose securely to the breather pipe.
- Reconnect the clutch cable to the release arm.
- Position the gearchange lever as was noted prior to removal and fit it to the shaft. Tighten the gearchange lever clamp bolt to **8 Nm**.
- Release and refit the foot control mounting bar, tightening the fixings to **27 Nm**.
- America and America LT from VIN 611104 only (except VIN 611134):** Refit the footboard assemblies (see page 16-32).
- Refit the left hand silencer as described in the relevant fuel system section.
- Fill the engine with the correct grade and type of engine oil (see page 9-10).
- Reconnect the battery, connecting the positive (red) terminal first, then fit the seat.
- Ensure the rear brake functions correctly after disturbing the foot control mounting bar.

Clutch

Clutch Release Mechanism

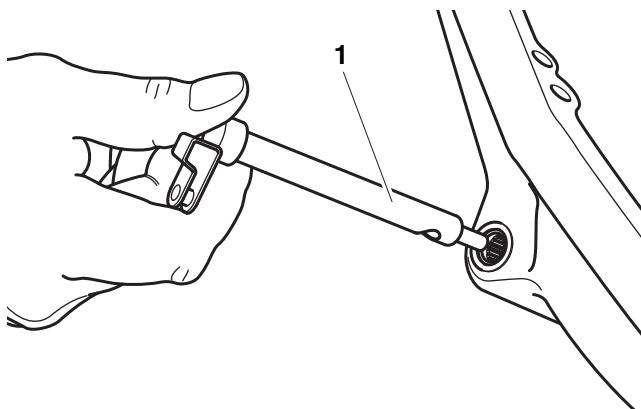
Removal

1. Remove the clutch cover (see page 5-6).
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.

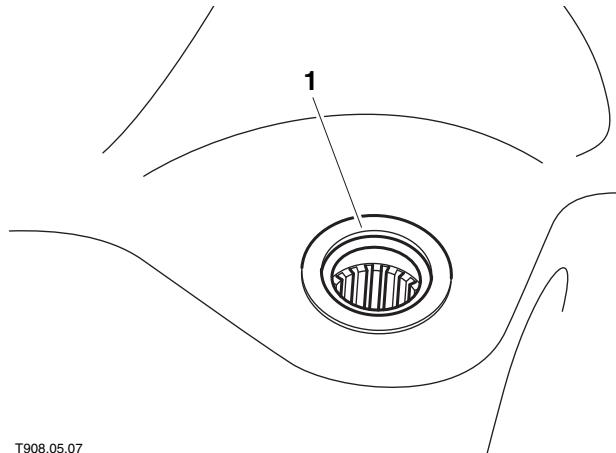


T908.05.06

1. Release arm

Inspection

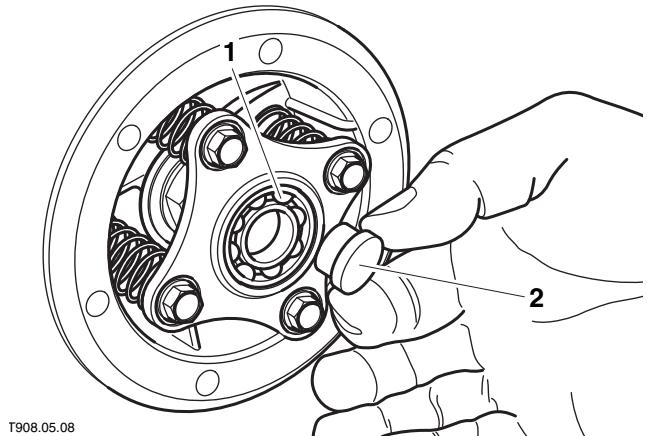
1. Inspect the release arm seal for signs of damage and, if necessary, renew. Carefully lever out the original seal and press the new seal into position, making sure its sealing lip is facing inwards.
2. Inspect the release arm needle roller bearings and the arm contact surfaces for signs of wear or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



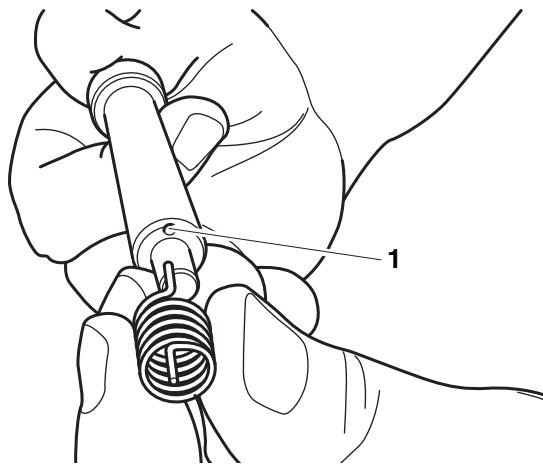
T908.05.08

1. Release bearing

2. Pushrod seat

Installation

1. Lubricate the seal lip, the needle roller bearings and the pushrod with clean engine oil.
2. Fit the return spring to the release arm, locating its end correctly in the arm hole.



T908.05.09

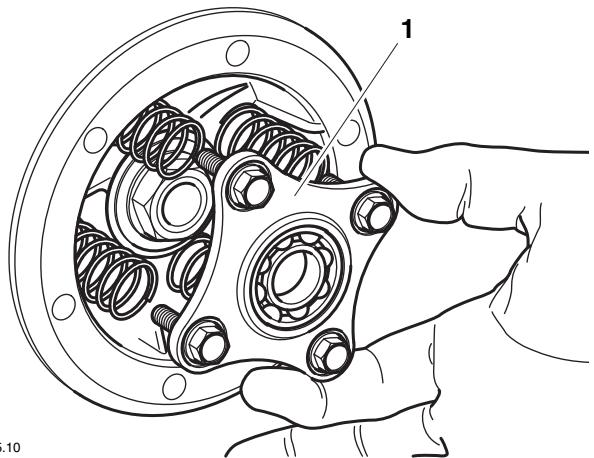
1. Release arm hole

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

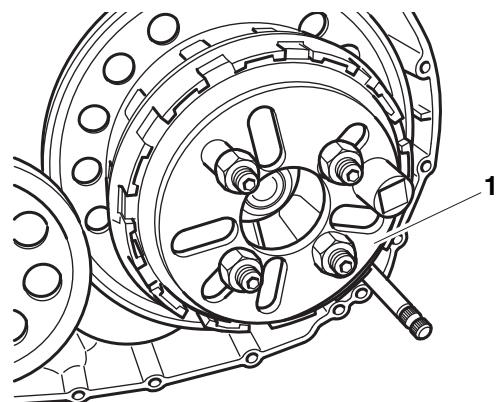
1. Remove the clutch cover (see page 5-6).
2. If the clutch drum is being removed, remove the starter clutch driven gear (see page 5-14).
3. Evenly and progressively slacken the four bolts securing the release plate to the clutch.
4. Remove the bolts and lift off the release plate (complete with the 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.

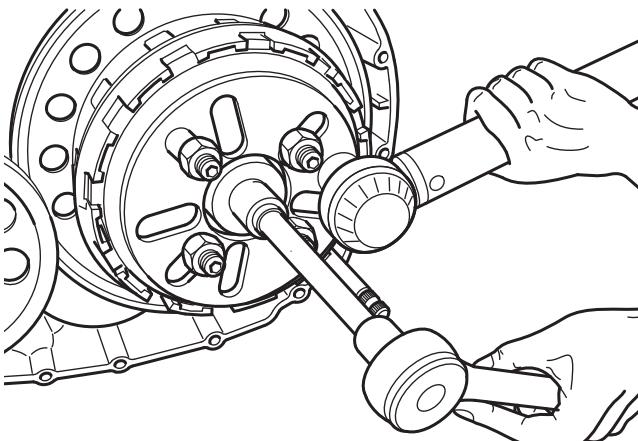


T908.05.11

1. Service tool T3880360

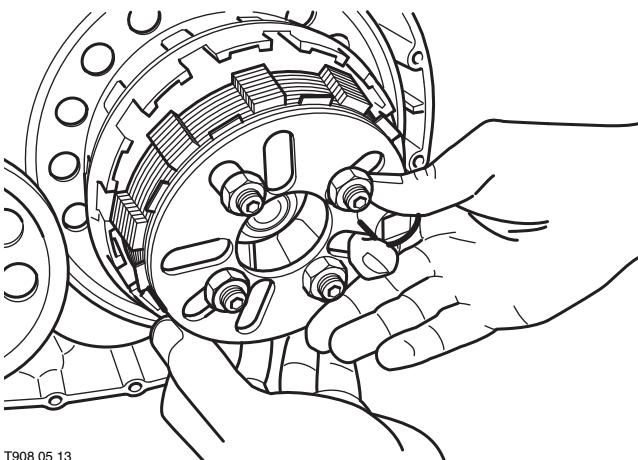
Clutch

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



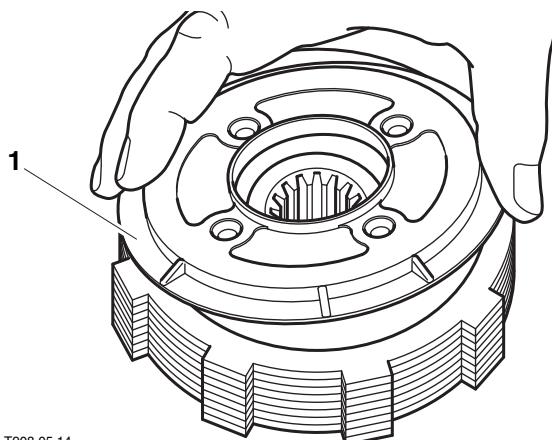
**Retain The Service Tool And Slacken
The Centre Nut**

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



Clutch Centre And Pressure Plate

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

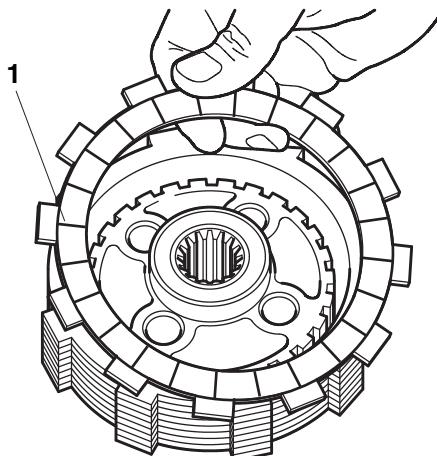


1. Pressure plate

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

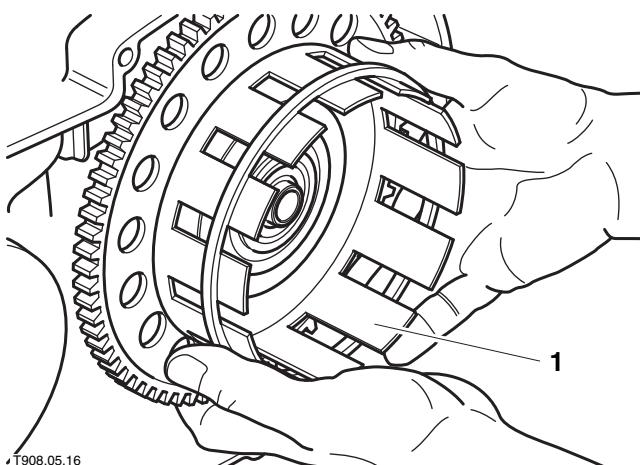
Note:

- 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.



1. Friction plate

- Slide the clutch drum off the input shaft.

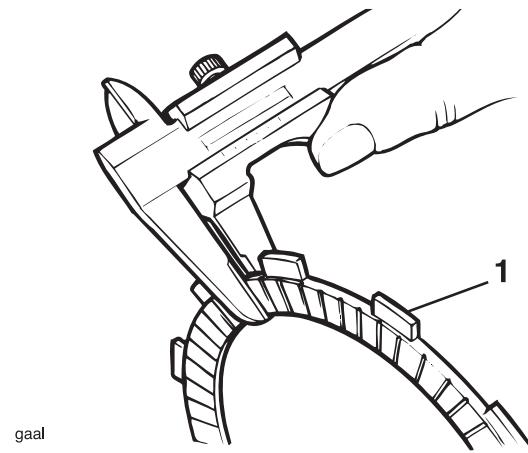


1. Clutch drum

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

Friction Plate Inspection

12. 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.



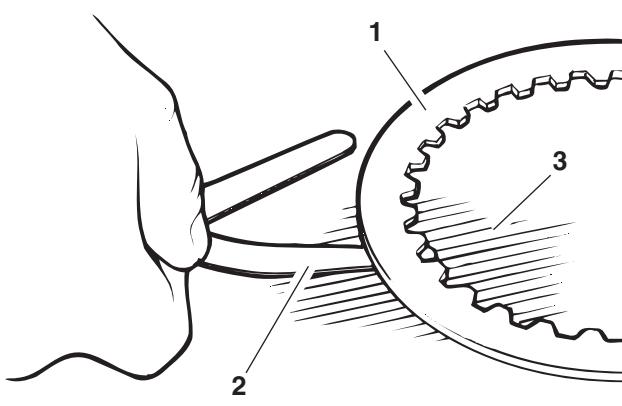
1. Friction disc

Friction plate thickness

Standard	3.22 - 3.38 mm
Service limit	3.1 mm

Steel Plate Inspection

13. 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.



1. Steel plate
2. Feeler gauge
3. Surface plate

Service limit	0.15 mm warpage
----------------------	------------------------

14. Inspect the grooves in the clutch centre for signs of wear or damage. Renew the clutch centre if damaged.
15. Inspect the clutch drum slots for signs of wear or damage. Renew the clutch drum if damaged.
16. 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.
17. Inspect the release plate bearing for signs of wear and renew if necessary.

Clutch Pack Height

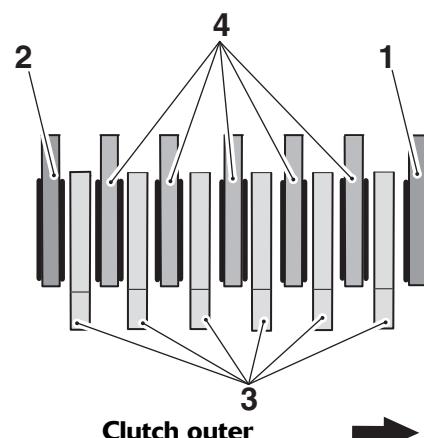
The clutch pack height should only be measured if the friction plates and the steel plates have been replaced.

The clutch pack height is critical for a smooth operation of the gearchange and needs to be measured prior to installation.

If used steel plates are being fitted, the clutch pack height measurement is not necessary, as the plates may not be worn to the service limit (and are therefore still serviceable), but could fall outside the clutch pack height tolerance when measured.

If building a new clutch pack its height must be correct. To achieve this, build the new clutch pack with the following:

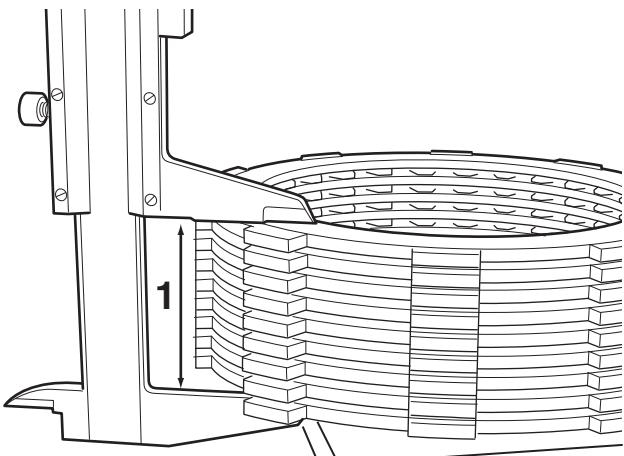
- 1 x new outer friction plate
 - 5 x new friction plates
 - 1 x new inner friction plate
 - 6 x steel plates, 1.4 mm thick.
1. Using a clean lint free cloth, wipe any excess oil from the clutch friction and steel plates.
 2. Arrange the new friction and new steel plates in a stack as shown below.



1. Outer friction plate
2. Inner friction plate
3. Steel plates
4. Friction plates

Clutch

3. Place the assembled clutch pack on a flat surface and measure its height as shown below.



1. Clutch pack height

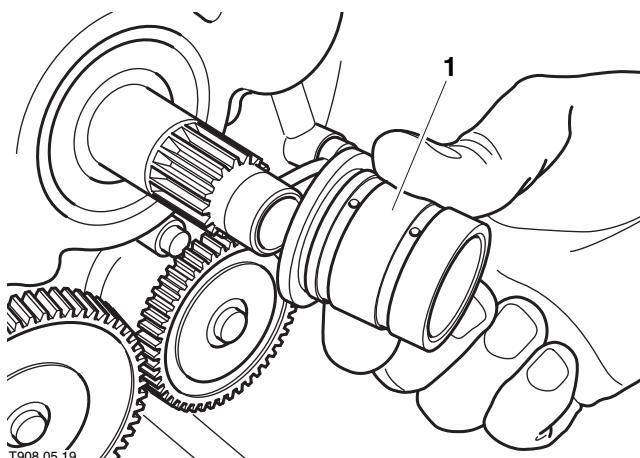
4. The correct clutch pack height for this clutch assembly is shown in the table below.

Standard height in mm	Tolerance in mm
35.10	+0.31 / -0.62

5. If the clutch pack height is incorrect, replace the friction plates and/or steel plates as required.

Installation

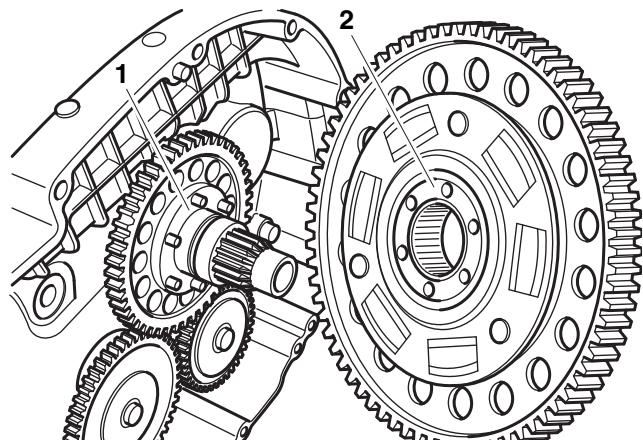
1. Lubricate the input shaft with clean engine oil then slide on the shouldered bush (shoulder innermost).



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:

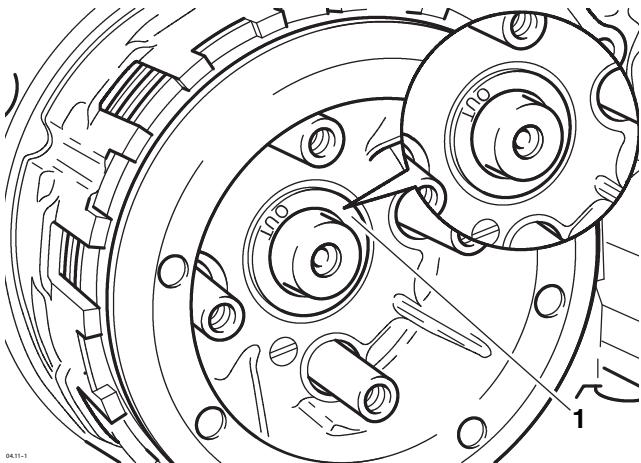
- Ensure that the clutch drum is correctly engaged with the oil pump drive gear before proceeding.
- 5. The innermost and outermost friction plates differ from the centre friction plates and the outermost steel plate differs from the other steel plates. Identification is as follows:
 - a) The innermost 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.

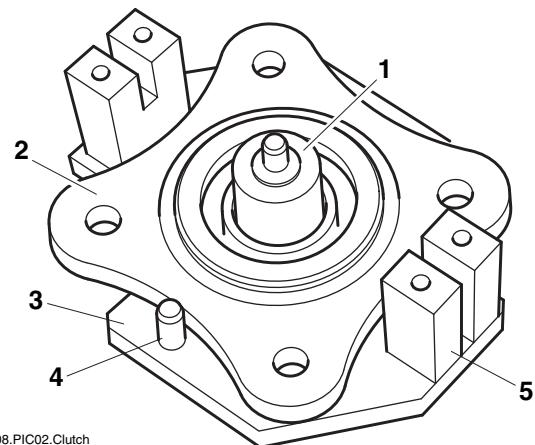
6. Coat all the friction and steel plates in clean engine oil.
7. Fit the outermost friction plate, followed by the outermost steel plate then alternately install the remaining friction and steel plates until the innermost friction plate has been installed.
8. Fit the pressure plate ensuring it engages 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 a new dished washer with its OUT marking facing outwards.



1. Dished washer

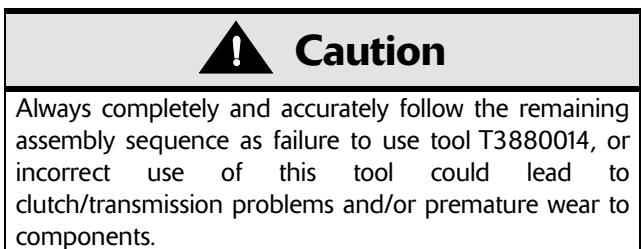
12. Screw on a new centre nut and tighten it to **105 Nm** whilst holding the service tool to prevent rotation.
13. Remove the service tool from the pressure plate.
14. Fit the clutch springs.
15. Ensure the bearing and pushrod seat are correctly installed in the release plate.
17. Locate the mandrel from the tool into the centre of both the tool and release plate (tapered end first).



T908.PIC02.Clutch

- 1. Mandrel**
- 2. Release plate**
- 3. Tool T3880014**
- 4. Location peg**
- 5. Tool feet**

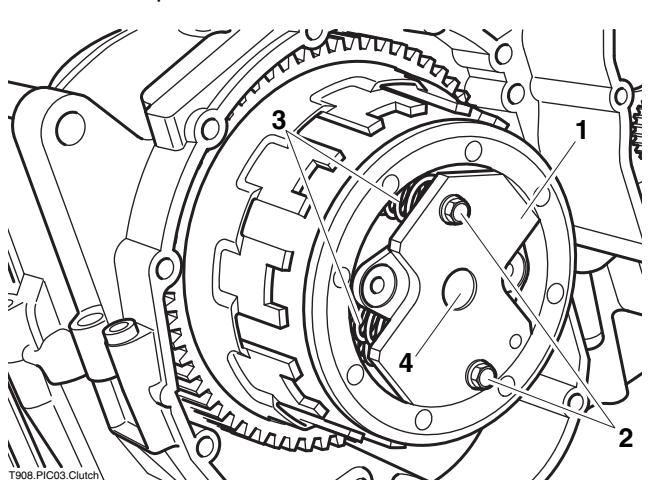
18. Position the plate, mandrel and tool assembly to the clutch springs.
19. Introduce the two bolts supplied through the holes in the tool, through two of the clutch springs, and loosely engage the bolt threads in the clutch inner drum. Ensure that the mandrel engages in the centre of the input shaft.



16. Locate the release plate assembly (bearing and pushrod 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 (13 mm and 14 mm). 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 14 mm 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.



T908.PIC03.Clutch

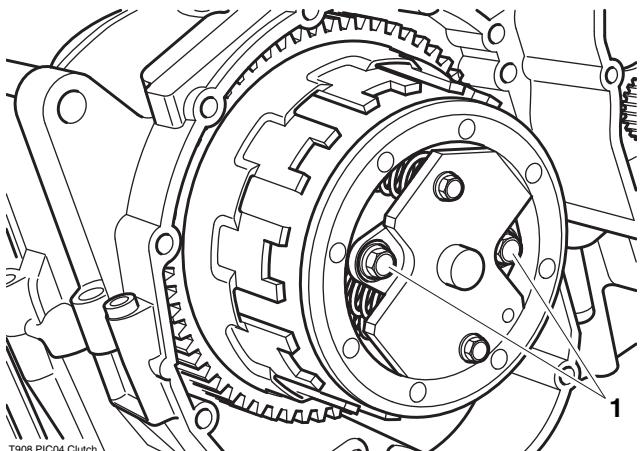
- 1. Tool T3880014**
- 2. Bolts**
- 3. Clutch springs**
- 4. Mandrel**

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

Clutch

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.



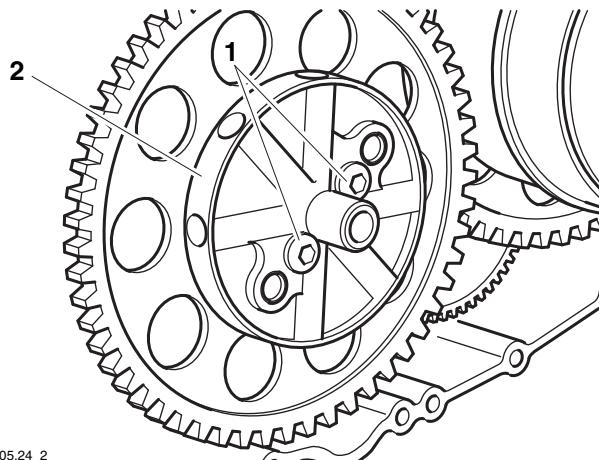
1. Bolt locations

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 (see page 5-15).
26. Refit the clutch cover (see page 5-7).

Starter Drive

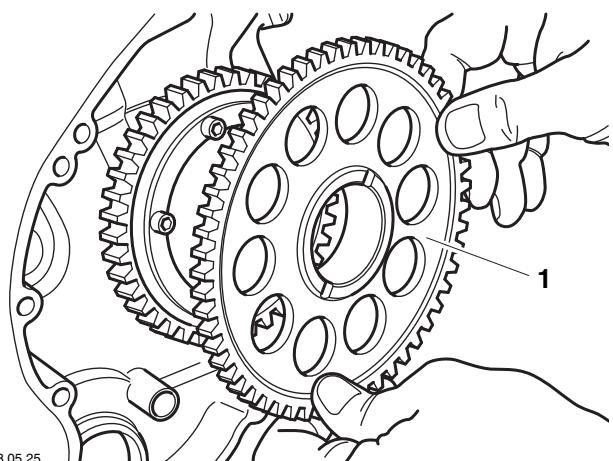
Removal

1. Remove the clutch cover (see page 5-6).
2. Slacken and remove the retaining screws and remove the centrifugal breather, if fitted, and the spacer plate from the crankshaft. Discard the screws.



T908.05.24_2

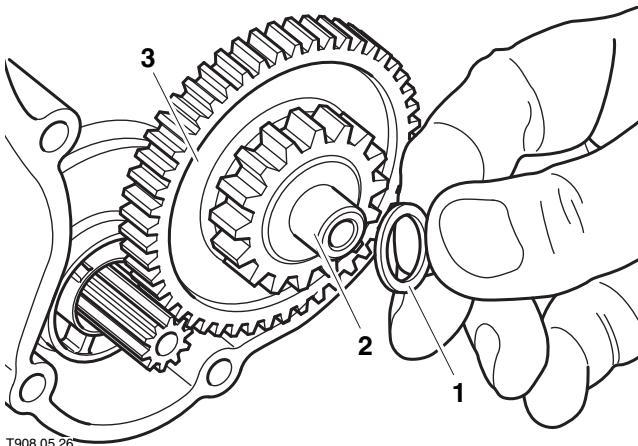
1. **Screws**
2. **Centrifugal breather - up to engine number 221608**
3. Rotate the driven gear in a clockwise direction and withdraw it from the end of the crankshaft.



T908.05.25

1. **Driven gear**

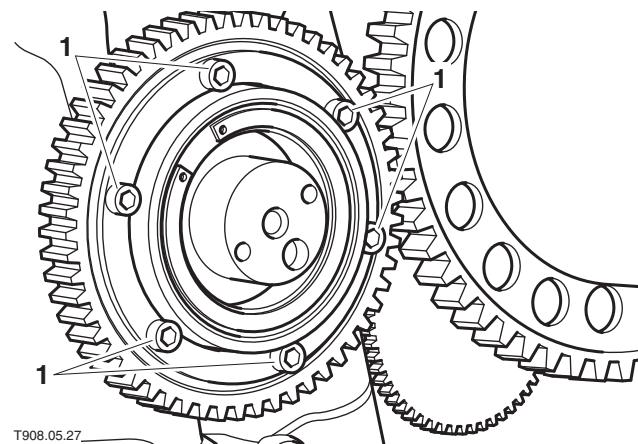
- Remove the wavey washer from the idler gear shaft then remove the shaft and idler gear.



T908.05.26

- Washer**
- Shaft**
- Idler gear**

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



T908.05.27

1. Sprag clutch housing bolts

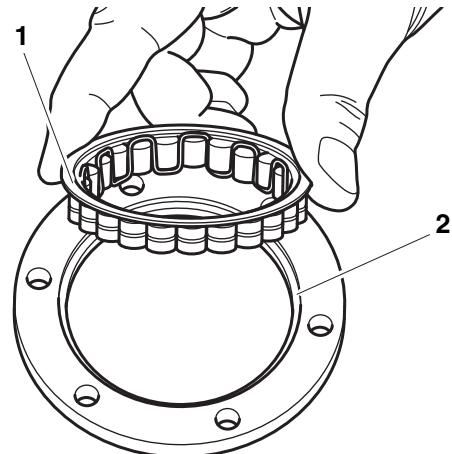
- Separate the sprag clutch and housing.

Inspection

- 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.
- 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

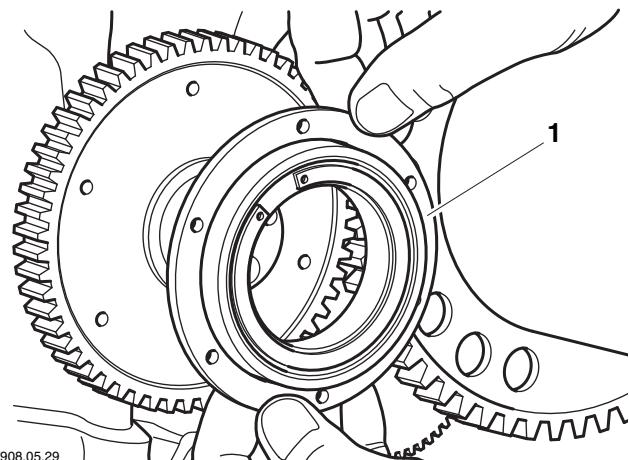
- Fit the sprag clutch to the rear of the housing. Push the clutch firmly into the housing until its lip is correctly seated in the housing recess.



T908.05.28

- Sprag clutch lip**
- Housing recess**

- 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**.



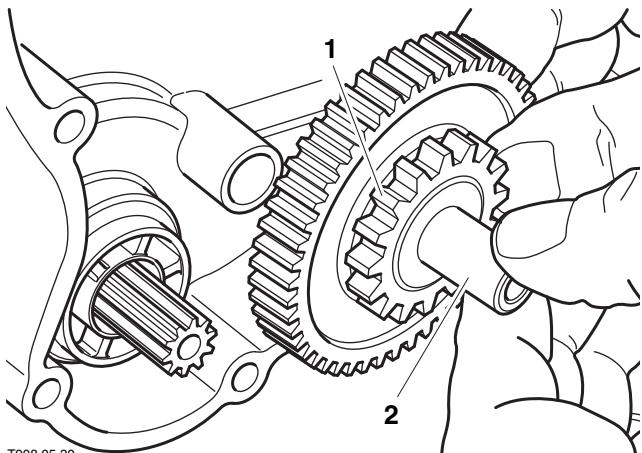
T908.05.29

1. Housing assembly

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

Clutch

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



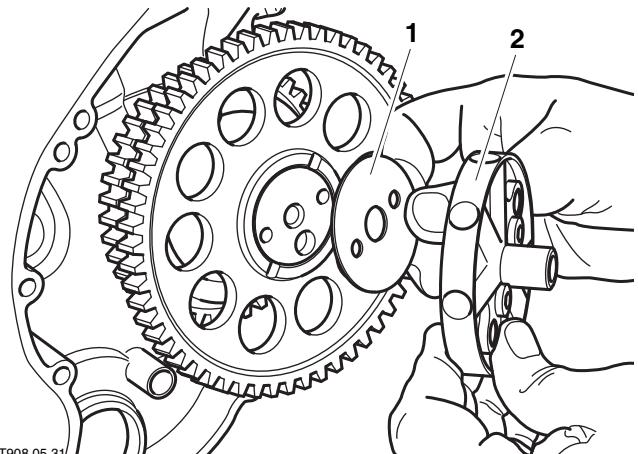
T908.05.30

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. Fit the spacer plate and, if fitted, the centrifugal breather to the crankshaft. Fit the new retaining screws and tighten to **12 Nm**.



T908.05.31

1. Spacer plate

2. Centrifugal breather - up to engine number 221608

8. Install the clutch cover (see page 5-7).

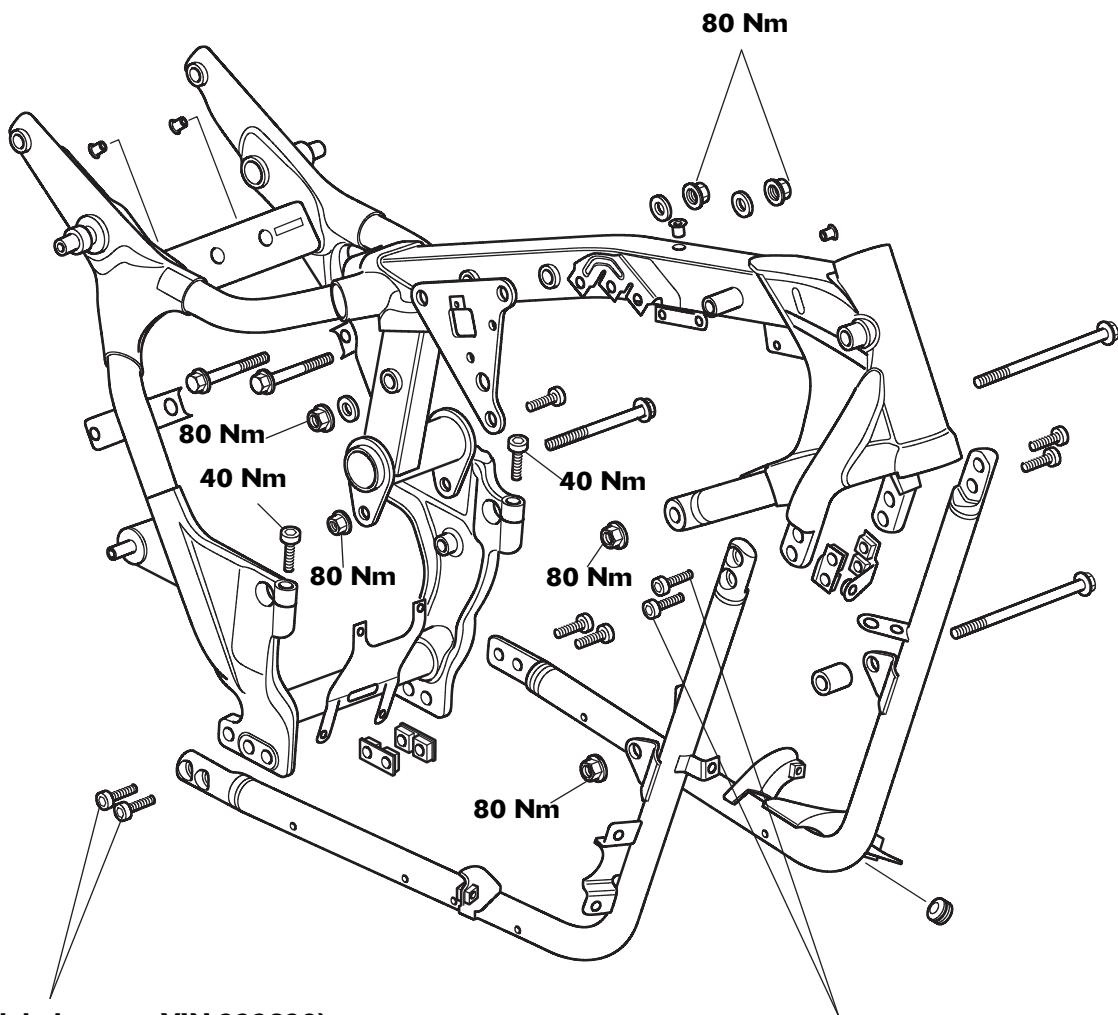
6 Engine Removal/Refit

Table of Contents

Exploded View - Engine Mountings	6.2
Engine	6.3
Removal	6.3
Installation	6.7

Engine Removal/Refit

Exploded View - Engine Mountings



55 Nm (black bolts up to VIN 333839)

40 Nm (silver bolts from VIN 333840)

55 Nm (black bolts up to VIN 333839)

40 Nm (silver bolts from VIN 333840)

Engine

Removal

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



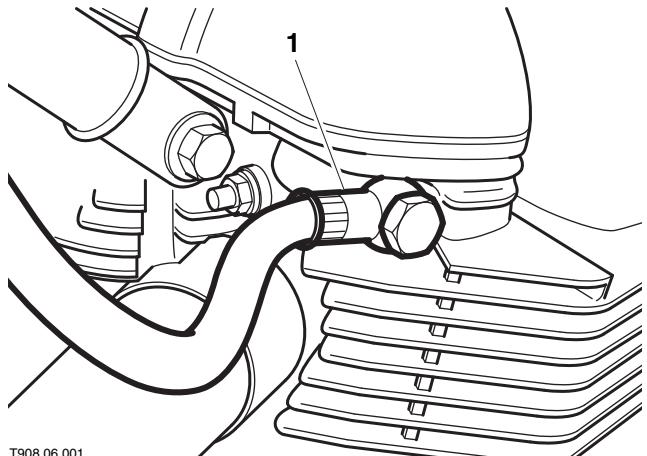
Warning

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

Carry out the following:

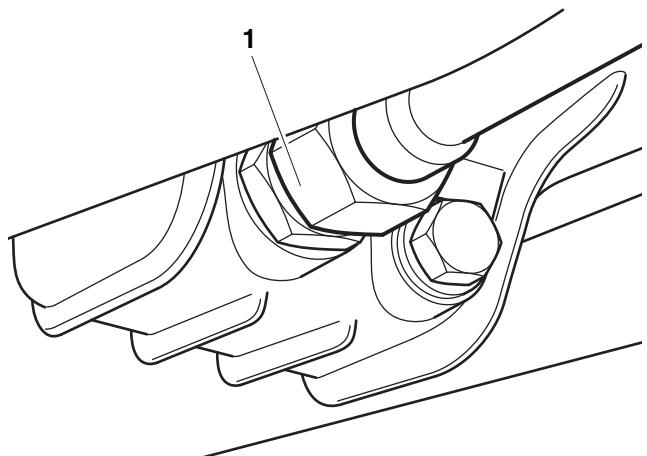
- Remove the seat (for America up to VIN 468389 see page 16-15, for Speedmaster, America and America LT from VIN 468390 see page 16-16).
 - Disconnect the battery, negative (black) lead first.
 - Remove the battery box (see electrical section).
 - Remove the fuel tank (see page 10A-11 for carburettor models or page 10B-76 for fuel injected models).
 - Remove the carburettors/throttle bodies (see page 10A-21 for carburettor models or page 10B-91 for fuel injected models).
 - Remove the complete exhaust system (see page 10A-34 for carburettor models or page 10B-105 for fuel injected models).
 - Remove the evaporative canister (California only).
- Drain the engine oil (see page 9-9). Once the oil has drained refit the sump plug, with a new sealing washer and torque to **25 Nm**.
 - Disconnect the spark plug caps from the plugs.
 - Remove the hoses connecting the secondary air injection control valve to the unions on the cylinder head.

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



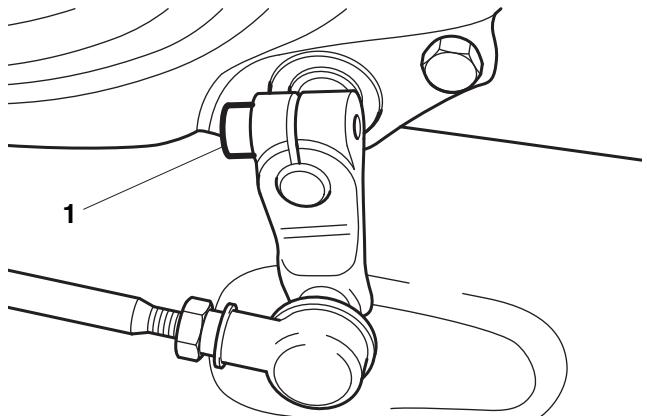
1. Oil cooler pipe connection

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



1. Oil cooler return pipe connection

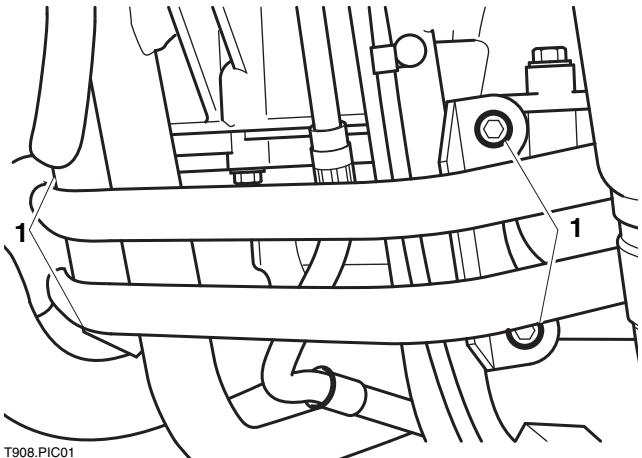
- Release the clips securing the rear brake hose to the right hand frame cradle tube.
- Note the position of the gearchange lever on its shaft then unscrew the clamp bolt and remove the lever.



1. Gearchange shaft

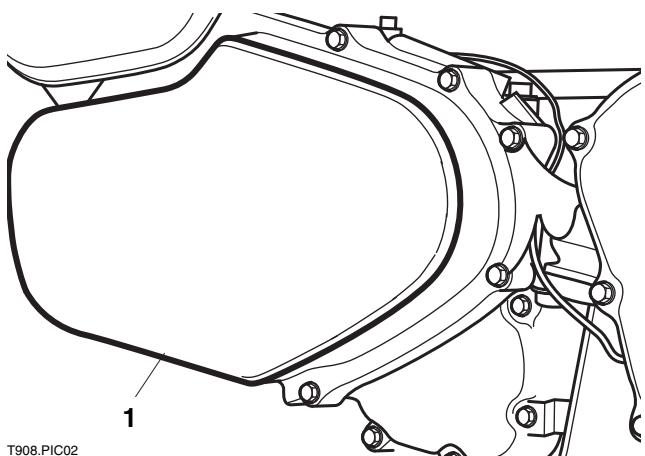
Engine Removal/Refit

9. **America and America LT from VIN 611105 only (except VIN 611134):** Remove the footboard assemblies (see page 16-31).
10. Release the foot control mounting bar from the frame. Taking care not to bend the rear brake hose, manoeuvre the bar assembly into a space above its mounting point. Cable-tie the bar in place.



1. Footrest bar fixing locations

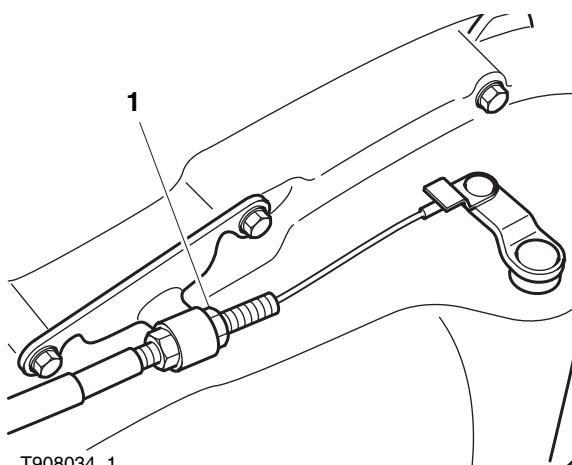
11. Remove the chain's sprocket cover.



1. Sprocket cover

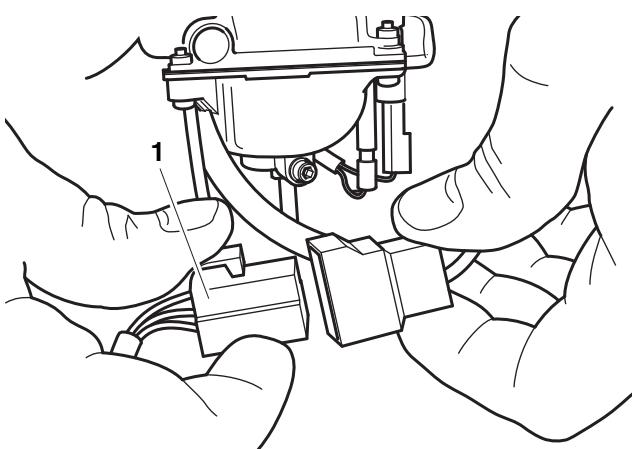
12. Slacken the lock nut and screw the clutch cable upper adjuster fully into the lever mounting bracket.

13. Slacken the clutch cable lower adjuster lock nut and back off the adjuster nut to give maximum free play in the cable.



1. Clutch cable lower adjuster

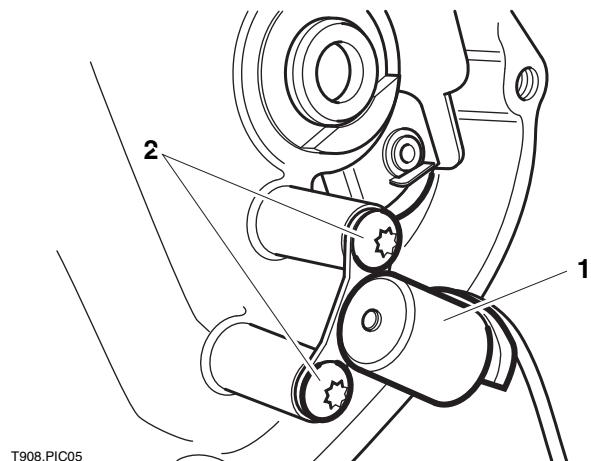
14. Free the clutch inner cable from the release arm then free the outer cable from its mounting bracket.
15. Disconnect the breather hose from the top of the crankcase.
16. Disconnect the following electrical connections from the engine:
 - Alternator
 - Low oil pressure warning light switch
 - Ignition pick-up coil (carburettor models)
 - Crankshaft position sensor (EFI models)
 - 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.



T908.PIC05

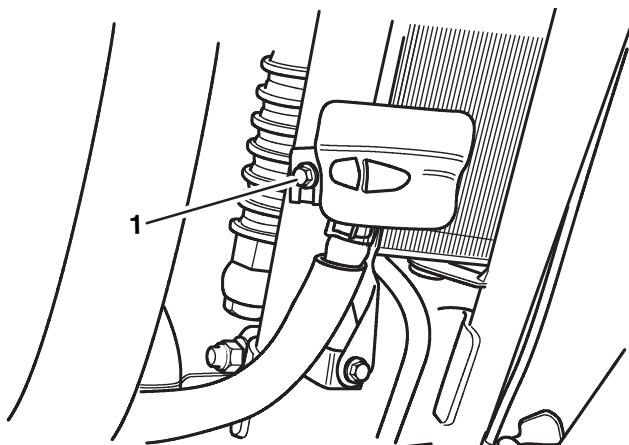
1. Ignition pick-up
2. Ignition pick-up fixings

17. Unscrew the nut and detach the cable from the starter motor. Release the starter motor cable from the right hand frame cradle tube, noting its correct routing.
18. Remove the oil cooler (see page 9-11).
19. Release the lower fixing securing the rear brake fluid reservoir/bracket to the frame.



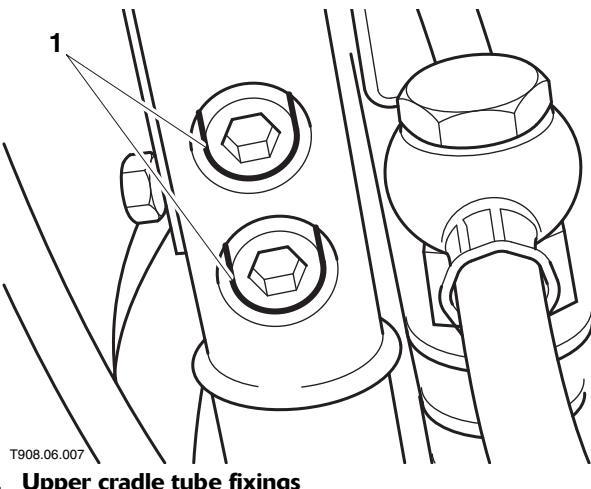
Warning

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.



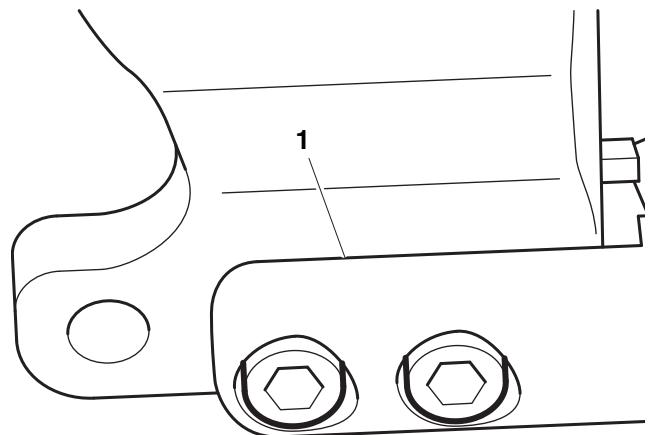
1. Rear brake fluid reservoir bracket bolt

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

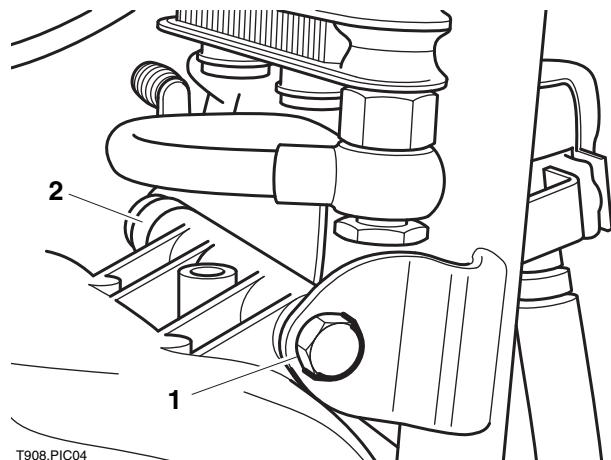


T908.06.007

1. Upper cradle tube fixings



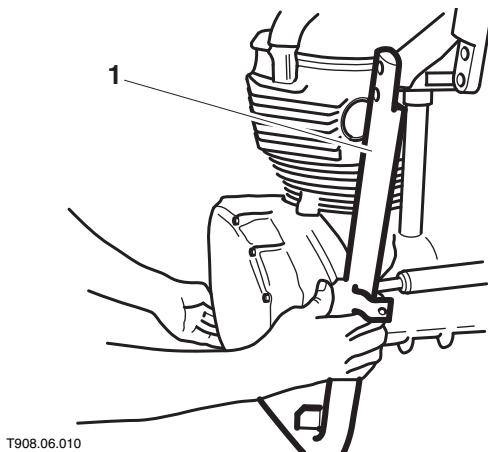
1. Lower cradle tube fixings



1. Front lower engine mounting bolt
2. Spacer

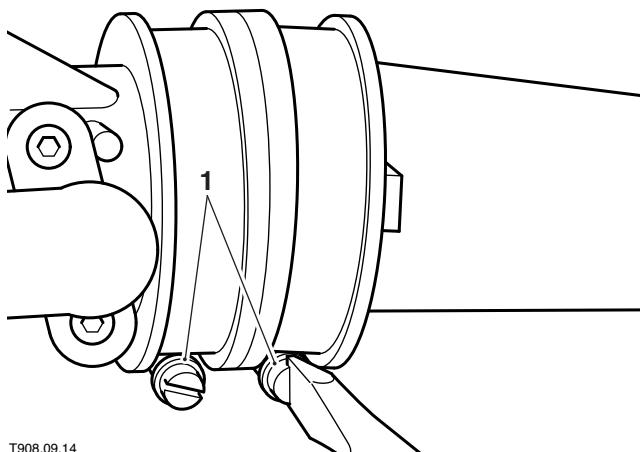
Engine Removal/Refit

21. With the aid of an assistant, detach the left hand cradle tube collecting the horn bracket, engine mounting bolt and spacer as you do so.
22. Collect the oil cooler and hoses and place to one side.
23. Remove the right hand frame cradle tube and front lower engine mounting bolt collecting the oil cooler bracket as you do so.



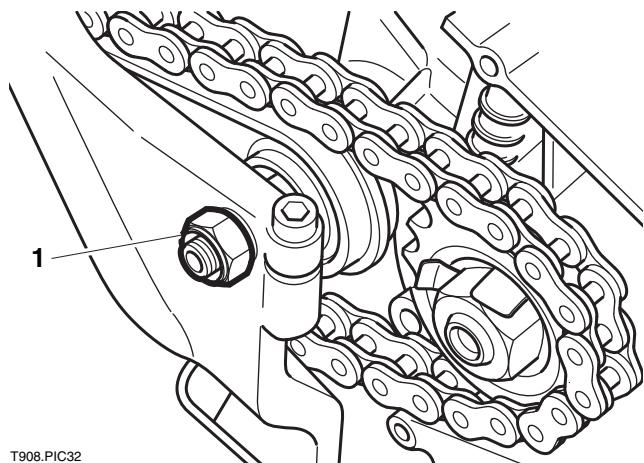
1. Right hand frame cradle tube

24. Set the chain adjustment to give maximum free play in the drive chain (see rear suspension section).
25. Detach the drive chain from the output sprocket.
26. Position a second jack beneath the rear of the engine. Raise the jack to support the engine's weight.
27. Release the clips securing the carburettor/throttle body rubbers to the inlet adapters and carburetors/throttle bodies.



1. Clips

28. Slacken but do not remove the swinging arm spindle clamp bolts on both sides.
29. Release the swinging arm spindle nut.

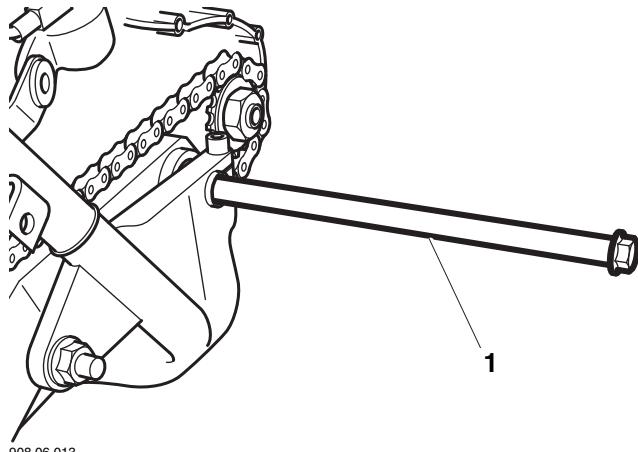


1. Spindle nut

30. 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).

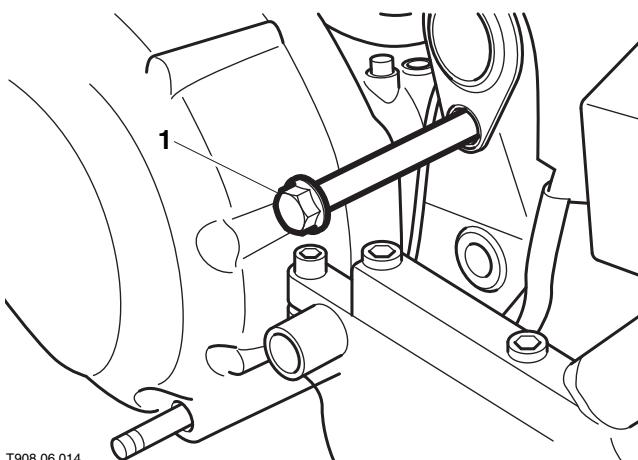
Warning

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.



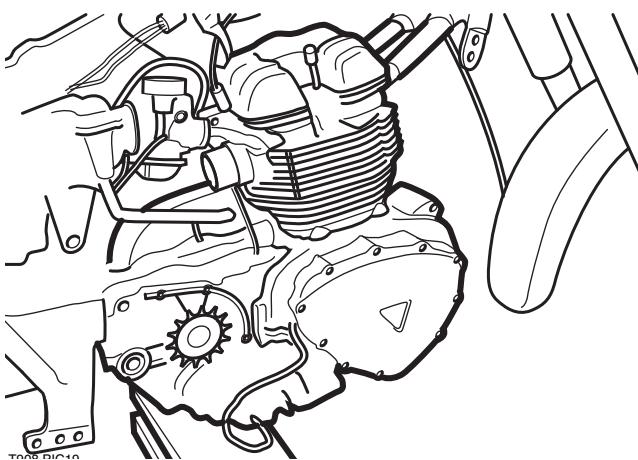
1. Swinging arm spindle

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



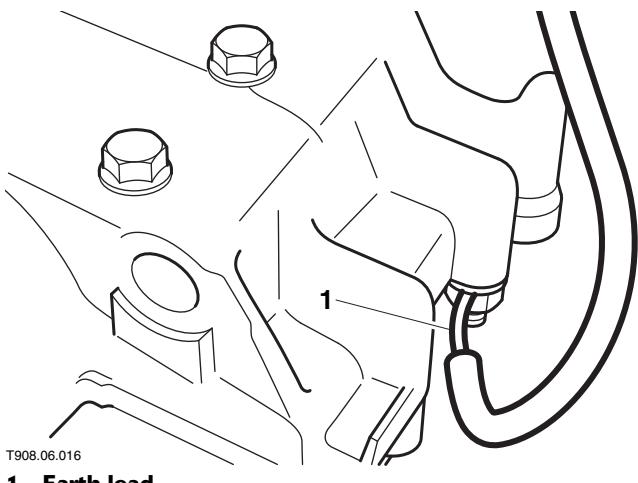
1. Lower rear engine mounting bolt

32. Release and remove the upper rear engine mounting bolt.
 33. 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

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



1. Earth lead

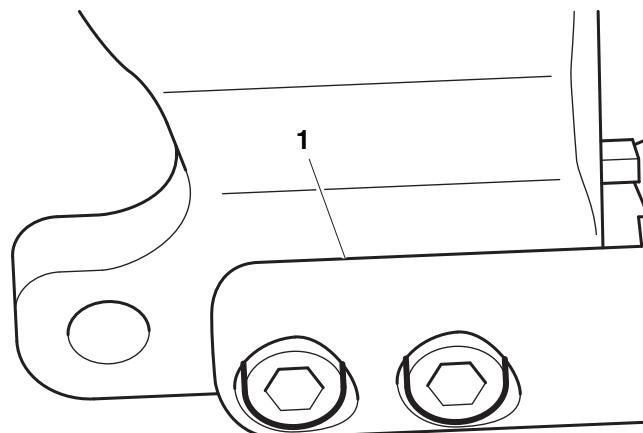
35. Raise the engine slightly and, with the aid of an assistant, remove the final engine mounting bolt.
 36. Lower the engine and separate it from the frame.

Installation

- Position the engine beneath the frame and sit it on the jack.
- Raise the engine and engage the front upper engine mounting, installing the bolt from the right hand side.
- Pivot the engine upwards at the rear and refit the earth lead. Tighten the earth lead fixing to **28 Nm**.
- 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:

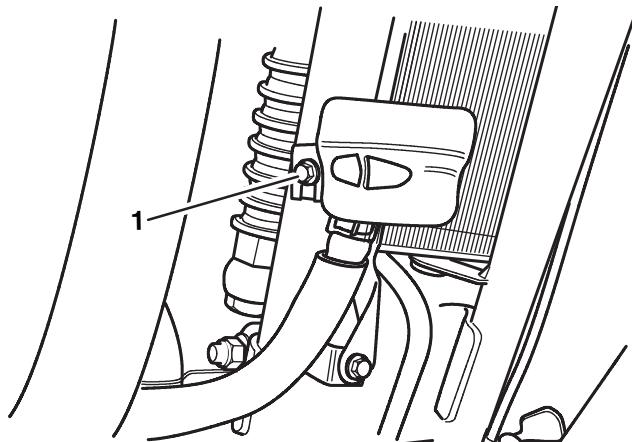
- All engine mounting bolts and the swinging arm spindle (which is not fully removed for removal) must be inserted from the right.**
- With the engine mounting bolts installed, remove the jack supporting the engine.
- Fit the frame tubes locating the horn bracket from the upper left mounting position and the oil cooler bracket from the upper right.
- Fit all the frame tube bolts (and large spacer on the centre-lower bolt) but do not tighten at this stage.
- Tighten the engine mounting bolts to **80 Nm**.
- Tighten the frame cradle tube bolts to **55 Nm** if black bolts (T3050220) are fitted, and **40 Nm** if silver bolts (T3050224) are fitted.



1. Frame tube bolts (two of eight shown)

Engine Removal/Refit

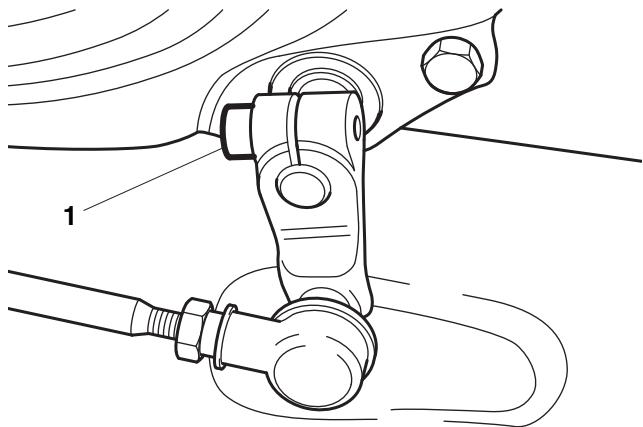
10. Push the swinging arm spacers through the frame into full engagement with the swinging arm.
11. Tighten the swinging arm spindle nut to **110 Nm**.
12. Tighten both swinging arm spindle clamp bolts to **40 Nm**.
13. Fit the oil cooler (see page 9-13).
14. Secure the rear brake fluid reservoir/bracket to the frame with the lower fixing, tighten the fixing to **3 Nm**.



1. Rear brake fluid reservoir bracket bolt

15. 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 cradle tube.
16. Reconnect the alternator, ignition pick-up coil (carburettor models), crankshaft position sensor (EFI models) low oil pressure warning light switch and neutral light wiring connectors. Ensure all wiring is correctly routed.
17. Reconnect the crankcase breather hose to the engine.
18. Reconnect and adjust the clutch cable (see clutch section).
19. Release and refit the foot control mounting bar and tighten its fixings to **27 Nm**.
20. Refit the clips and secure the rear brake hose to the right hand frame cradle tube.
21. **America and America LT from VIN 611105 only (except VIN 611134):** Refit the footboard assemblies (see page 16-32).

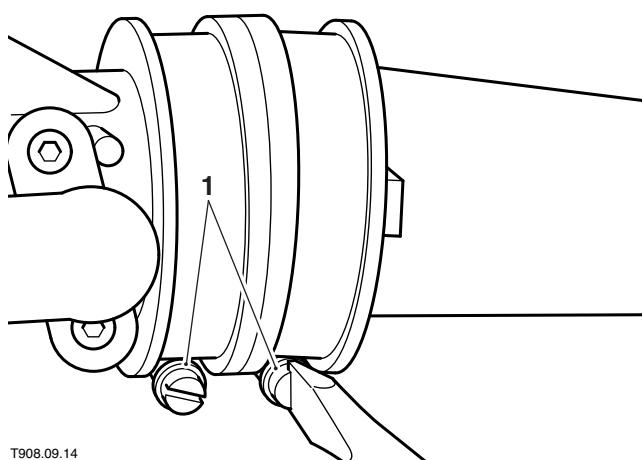
22. Position the gearchange lever as was noted prior to removal and fit it to the shaft. Tighten the clamp bolt to **9 Nm**.



T908.03.06

1. Gearchange shaft

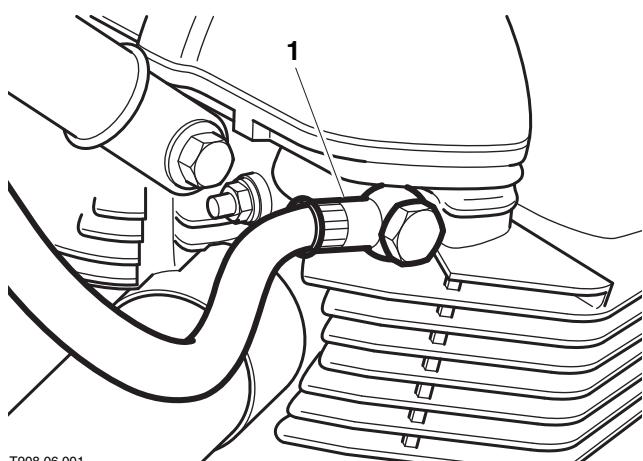
23. Position and tighten the carburettor/throttle body hose clips.



T908.09.14

1. Retaining clips

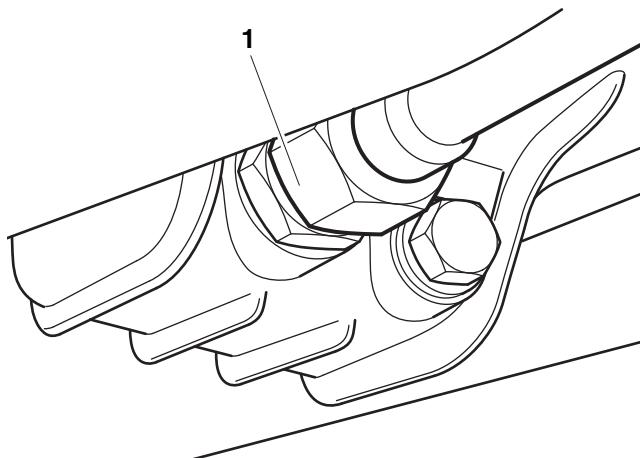
24. Incorporating new sealing washers, fit and tighten the oil cooler hoses to the cylinder head. Tighten to **30 Nm**.



T908.06.001

1. Oil cooler feed pipe connection

25. Fit and tighten the oil cooler connection to the sump. Tighten to **15 Nm** while holding the sump union to prevent it from turning.



1. Oil cooler sump connection

26. Locate the chain to the output sprocket.
27. Refit the sprocket cover tightening the bolts to **10 Nm**.
28. Refit the hoses connecting the secondary air valve to the unions on the cylinder head.
29. Refit the HT leads to the spark plugs.

30. Install the exhaust system (see page 10A-34 for carburettor models or page 10B-105 for fuel injected models).
31. Fill the engine with the correct grade and type of engine oil (see page 9-10).
32. Install the carburettors/throttle bodies (see page 10A-21 for carburettor models or page 10B-92 for fuel injected models).
33. Fit the battery box.
34. Refit the fuel tank as described in the fuel system section (see page 10A-12 for carburettor models or page 10B-77 for fuel injected models).
35. Refit the evaporative canisters (California only).
36. Install the battery, reconnect the positive (red) lead first.
37. Lower the motorcycle, remove the jack and park it on the side stand.
38. Check and adjust the drive chain free play as described in the final drive section (see page 14-3).
39. 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.

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7 Crankshaft, Connecting Rods & Balancers

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Crankshaft, Connecting Rods & Balancers

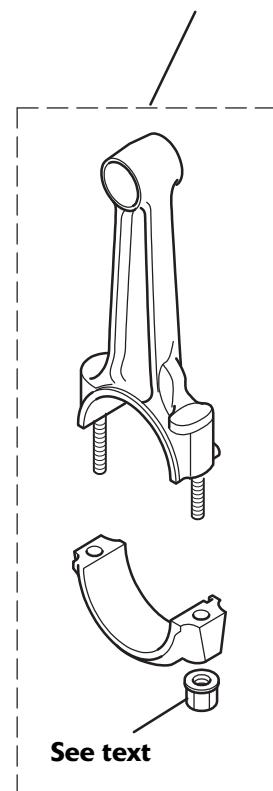
Cam Chain	7.19
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Exploded View - Crankshaft and Connecting Rods

Up to engine number 197183

From engine number 253372 to 292625

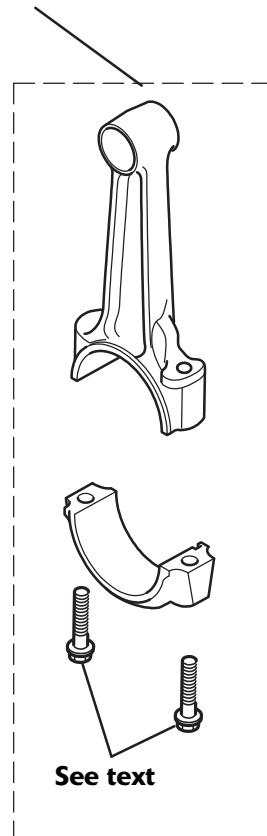
From engine number 296931 onwards



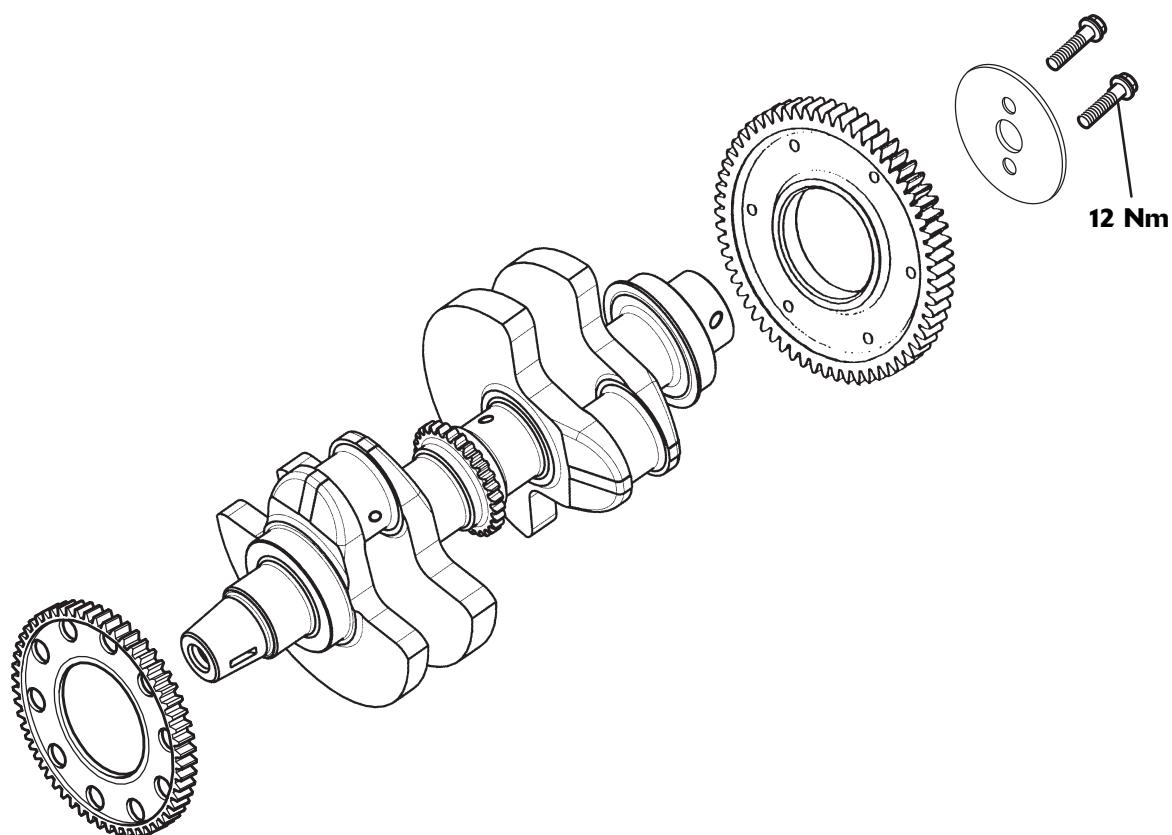
See text

Up to engine number 197184 to 253371

From engine number 292626 to 296930



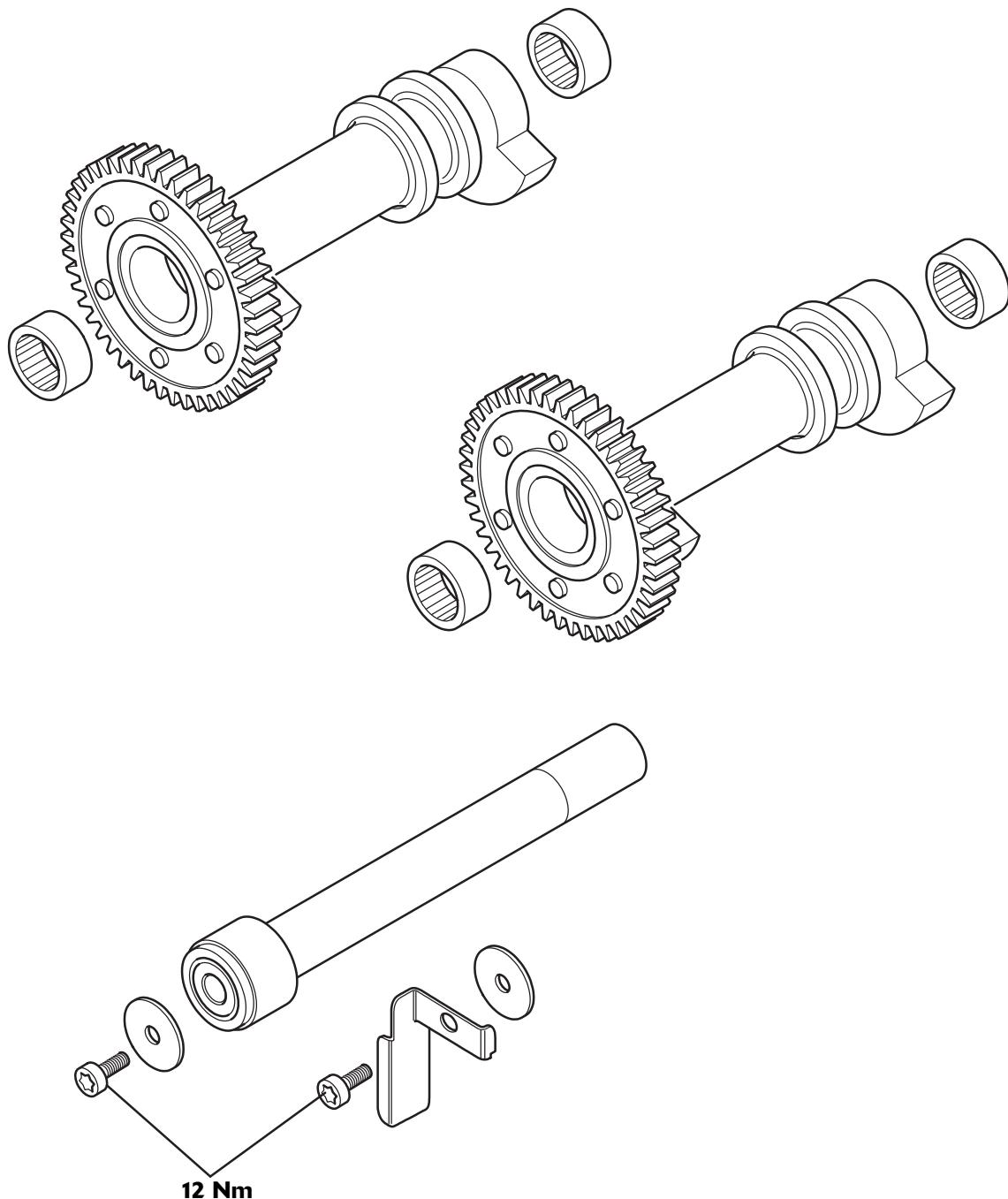
See text



12 Nm

Crankshaft, Connecting Rods & Balancers

Exploded View - Balancers



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.
- During production, three different sets of torque values have been used for crankcase bolts on this engine, depending on the plating finish used on the bolts. The tightening sequence has not changed. Pay particular attention to the crankcase bolts fitted to the engine you are working on and select the correct torque values. Refer to the table on page 7 for the correct torque values, then refer to the tightening sequence on page 8.

Disassembly

- Remove the engine from the frame (see page 6-3).
- Remove the following items (see relevant sections for removal details):
 - Alternator rotor (see page 17-34)
 - Clutch assembly (see page 5-9)
 - Starter motor (see page 17-41)
 - Sump and oil pick-up (see page 9-13)
 - Camshaft drive gear (only necessary if the crankshaft is to be removed) (see page 3-15)
 - Cylinder head (see page 3-17), barrels (see page 4-3) and pistons (see page 4-5) (only necessary if the connecting rods are to be removed).



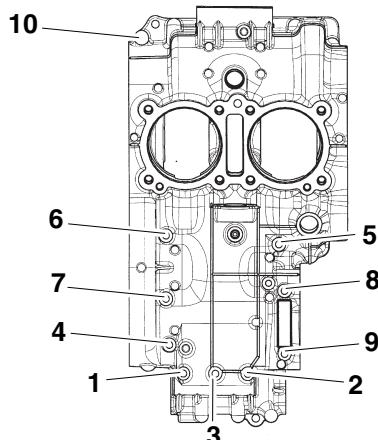
Caution

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

- 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).

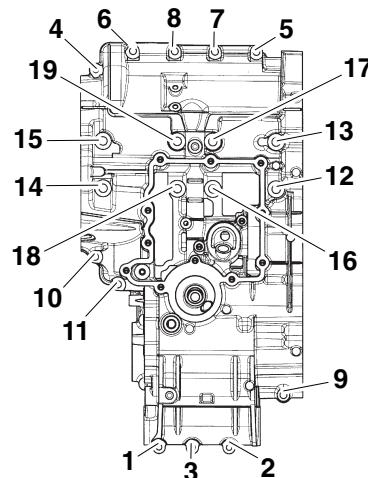


Upper Crankcase Bolt Slackening Sequence

- Invert the engine.
- 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

- 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.

Crankshaft, Connecting Rods & Balancers



Caution

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

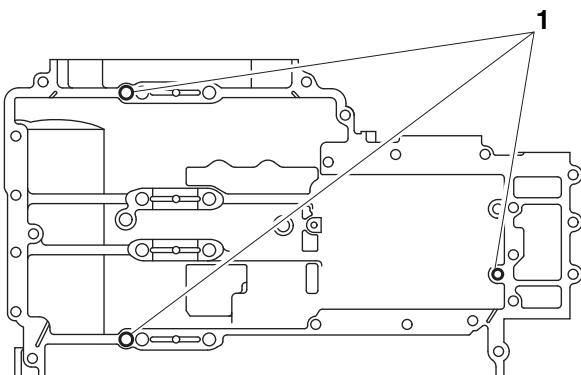


Caution

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.

Assembly

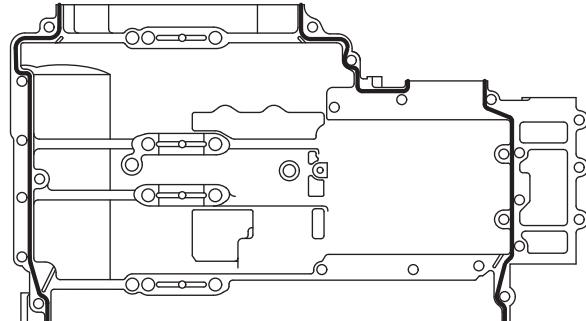
1. Ensure that the balancer shafts (see page 7-17), transmission shafts (see page 8-9), crankshaft (see page 7-10) and connecting rods (see page 7-13) are all correctly fitted to the upper crankcase half.
2. Ensure the selector drum and forks (see page 8-6), oil pressure relief valve (see page 9-16) and lower main bearing shells (see page 7-11) 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.



T908.06.01a

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 ThreeBond 1216 liquid gasket) to the lower crankcase mating surface as shown in the diagram.



T908.06.01a

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

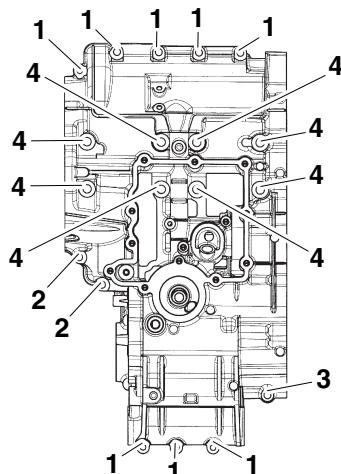
Do not force the lower crankcase half onto the upper half. If the lower half will not seat properly, lift it off again and check that the selector forks and gears are correctly positioned. NEVER USE THE BOLTS TO DRAW THE CRANKCASE HALVES TOGETHER.

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.

Crankshaft, Connecting Rods & Balancers

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



Lower Crankcase Bolt Locations

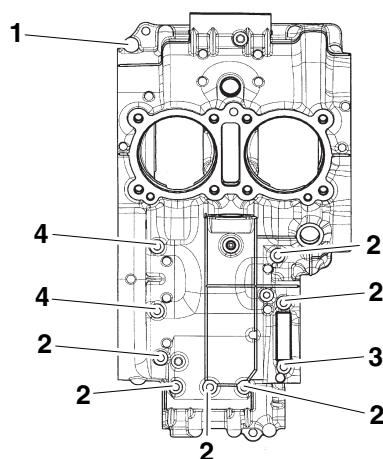
- M8 x 35 mm**
- M8 x 43 mm**
- M8 x 80 mm**
- M10 x 118.5 mm (up to engine number 326093)**
- M10 x 120.5 mm (from engine number 326094)**
- Turn the crankcase assembly over and install the upper crankcase bolts in their correct locations and hand-tighten them.

Caution

The table on this page describes the torque values used on each of the crankcase bolts. The first two sets of values are selected according to the colour of the M10 size (main bearing) crankcase bolts, the third set of values are selected by engine number. Carefully check which M10 bolts are fitted to the engine being worked on before tightening and select the correct torque values.

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

Model and main bearing bolt description	Stage 1 all bolts	Stage 2 M10 main bearing bolts	Stage 3 All M8 bolts
Carburettor models with silver M10 x 118.5 mm bolts	10 Nm	40 Nm	32 Nm
Carburettor models with olive green M10 x 118.5 mm bolts	10 Nm	75°	32 Nm
Carburettor and EFI models from engine number 326094 with silver M10 x 120.5 mm bolts	10 Nm	75°	32 Nm



Upper Crankcase Bolt Locations

- M8 x 35 mm**
- M8 x 80 mm**
- M8 x 105 mm**
- M8 x 130 mm**

Crankshaft, Connecting Rods & Balancers

Tightening Procedure

11. **Stage 1** - Invert the crankcase assembly then tighten the lower crankcase bolts to **Stage 1** (as described in the table on page 7-7) in the specified sequence.



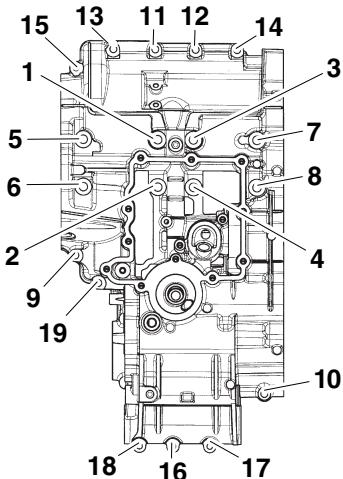
Caution

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



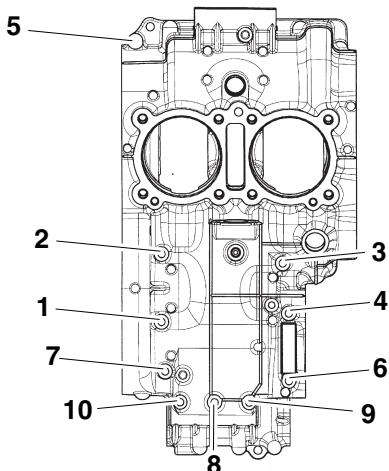
Caution

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 **Stage 1** (as described in the table on page 7-7) in the specified sequence.



Upper Crankcase Bolt Tightening Sequence

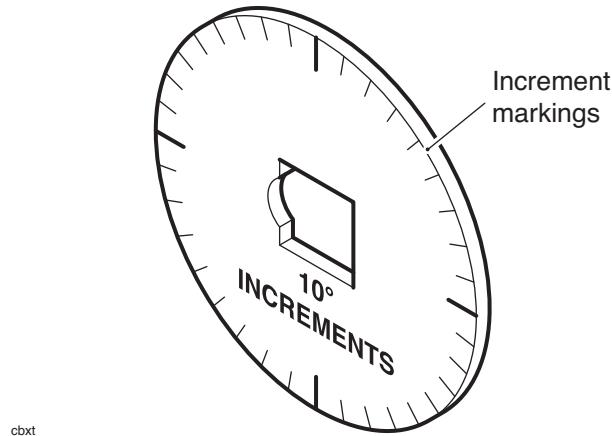


Caution

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

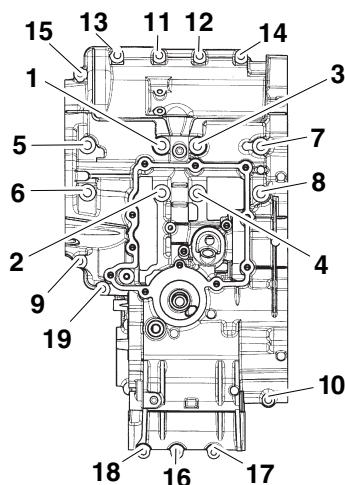
Note:

- Use service tool T3880105 to ensure accuracy when angle-tightening.



Service Tool T3880105

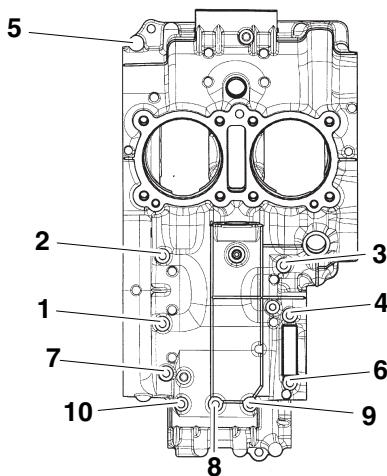
13. **Stage 2** - Turn the crankcase assembly over then tighten the M10 main bearing bolts in the lower crankcase (bolts 1 to 8) to **Stage 2** (as described in the table on page 7-7) in the specified sequence.
14. **Stage 3** - Tighten the remaining lower crankcase bolts (bolts 9 to 19) to **Stage 3** (as described in the table on page 7-7) in the specified sequence.



Lower Crankcase Bolt Tightening Sequence

Crankshaft, Connecting Rods & Balancers

15. Turn the crankcase assembly over then tighten the upper crankcase bolts to **Stage 3** (as described in the table on page 7-7) in the specified sequence.



Upper Crankcase Bolt Tightening Sequence

16. Check that the crankshaft and transmission shafts rotate smoothly. Investigate and rectify any problems before proceeding.
17. 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).
18. Refit the engine to the frame (see page 6-7).

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 (see page 7-5).
2. Remove the connecting rods (see page 7-12).
3. 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 the crankshaft endfloat. If the crankshaft endfloat is outside the specified service limits, the crankshaft and/or the crankcase must be renewed.

Crankshaft, Connecting Rods & Balancers

Crankshaft endfloat:

Standard	0.05 to 0.20 mm
Service limit	0.4 mm

- 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.

- 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.**
- 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.**
- Lubricate the running surfaces of all bearing shells in the connecting rods with a 50/50 solution of engine oil and molybdenum disulphide grease.
 - Ensure that the crankshaft is clean and that the oilways within the crankshaft are free from blockages and debris.
 - Fit the cam chain to the crankshaft and locate it on its sprocket.
 - 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.
 - Ensure the crankshaft and front balancer gears are correctly timed then install the rear balancer.
 - Refit the connecting rods (see page 7-13).
 - Assemble the crankcase upper and lower halves (see page 7-6).

Main Bearing Shell Selection And Journal Clearance Check

Shell selection

- 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.
- Measure each crankshaft main bearing journal diameter.
- Assemble the crankcase halves with the crankshaft and main bearing shells removed and measure each crankcase main bearing bore diameter.
- 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 DIAMETER (millimetres)	
CRANKCASE 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

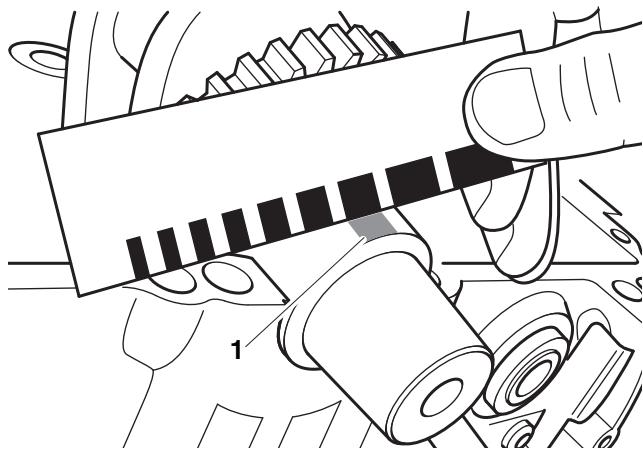
Journal clearance check

- The main bearing journal clearances are measured using *Plastigauge* (Triumph part number 3880150-T0301) as follows.
 - Ensure all upper and lower main bearing shells are correctly fitted to the crankcase halves.
 - Wipe clean the bearing shells and crankshaft journals then lay the crankshaft in position in the upper crankcase.
 - 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.
 - Size a piece of *Plastigauge* to fit across each main bearing journal.
 - Fit the *Plastigauge* to each main bearing journal, using the grease to hold it in place.

- 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 *Plastigauge*, resulting in a false reading.**
- Remove the main bearing bolts and separate the crankcase halves, again taking care not to rotate the crankshaft.
- Using the gauge provided with the *Plastigauge* kit, measure the width of the compressed *Plastigauge* to obtain the journal clearance.



Main bearing journal clearance:

Standard	0.019 to 0.044 mm
Service limit	0.10 mm

- If the clearance exceeds the specified limits, select a complete new set of bearing shells and repeat the check.
- 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.

Crankshaft, Connecting Rods & Balancers

Connecting Rods



Warning

Two different types of connecting rod have been fitted to America, America LT and Speedmaster models.

The two connecting rod types are not interchangeable and must be renewed as a set. Severe engine damage could result from mixing connecting rod types, leading to loss of motorcycle control and an accident.

Identification

America, America LT and Speedmaster models have had two different types of connecting rod installed during manufacture. The two connecting rod types can be identified as follows:

- The first type used during manufacture can be identified by its size marking - letter markings (A or B) or numerical markings (4 or 5) - with big ends secured with nuts and bolts.
- The second type has no size markings; and uses a fracture split big end secured only with bolts.

Note:

- **New connecting rod big-end fixings will be required on installation.**

Removal

1. Disassemble the crankcase halves (see page 7-5).
2. Rotate the crankshaft to bring each piston to BDC.

Note:

- **This must be done one piston at a time.**
- 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).

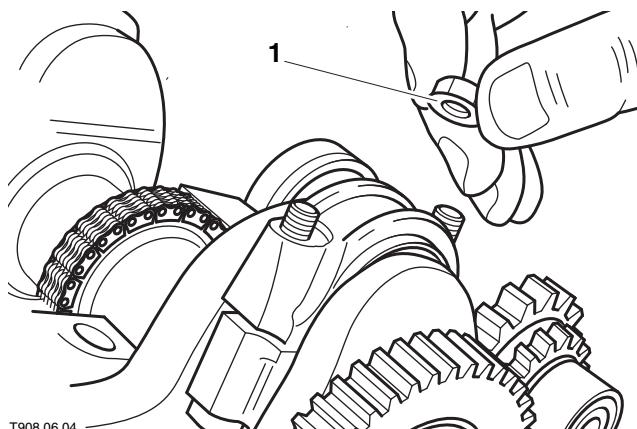


Caution

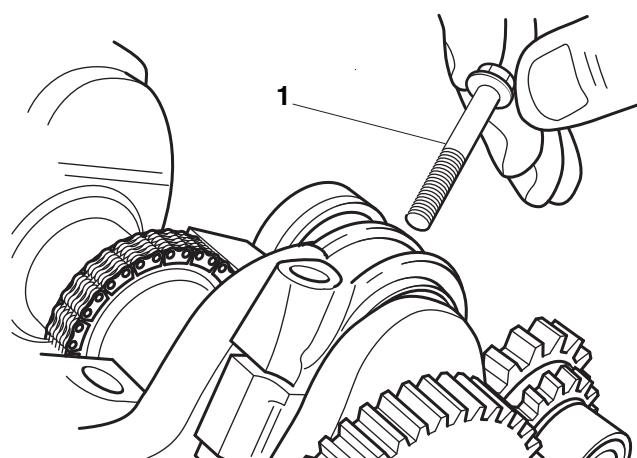
The big end caps and connecting rods on fracture split connecting rods have unique joint faces. The big end caps MUST be fitted in the same orientation as removal, and the big end caps must be installed to the connecting rods from which they are removed.

When correctly installed, the bearing shell locating notches will be adjacent to each other. Severe engine or connecting rod damage will result from incorrect fitment.

4. Evenly and progressively slacken and remove the big-end cap nuts or bolts (where fitted).

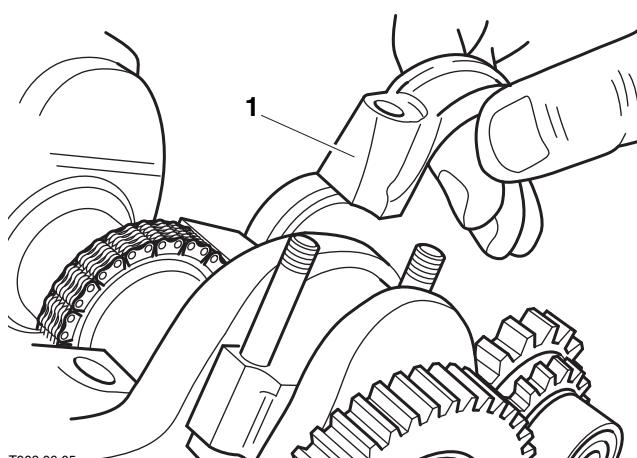


1. Big-end cap nut



1. Big-end cap bolt

5. 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 (nut type fixing shown)

6. Reassemble the rod and cap, complete with bearings, to keep all components together.

Crankshaft, Connecting Rods & Balancers

Note:

- If both connecting rods are being removed, mark each rod in some way to ensure it is refitted in its original location.

Inspection

- 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.

- Where connecting rods are fitted with nuts and bolts, install new bolts.

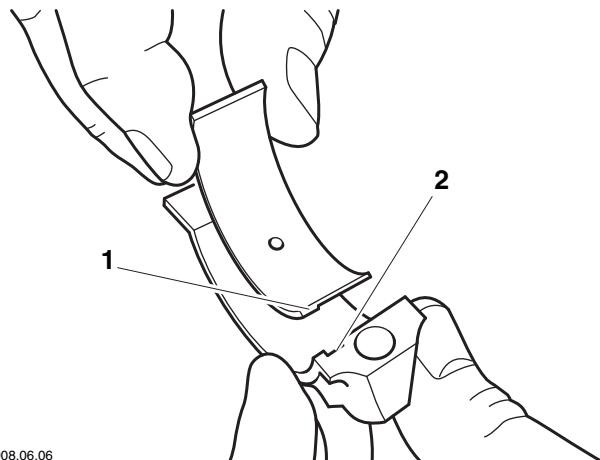
Note:

- 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.
- Set the crankshaft to BDC. Each connecting rod can then be installed as follows.

Note:

- This must be done one connecting rod at a time.

- 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.



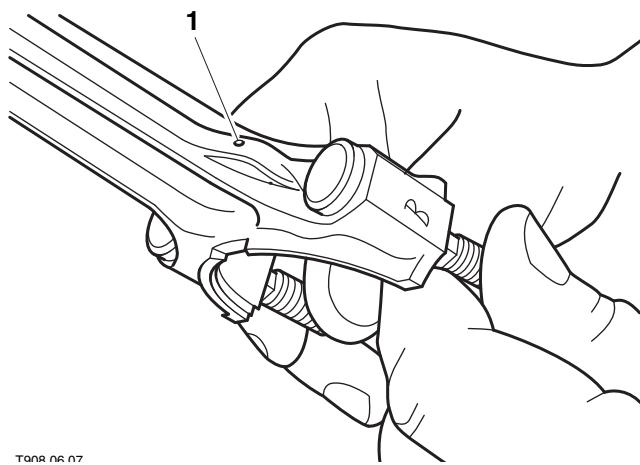
T908.06.06

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.
- 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.



T908.06.07

1. Connecting rod oil hole

Crankshaft, Connecting Rods & Balancers



Caution

The big end caps and connecting rods on fracture split connecting rods have unique joint faces. The big end caps MUST be fitted in the same orientation as removal, and the big end caps must be installed to the connecting rods from which they are removed.

When correctly installed, the bearing shell locating notches will be adjacent to each other. Severe engine or connecting rod damage will result from incorrect fitment.

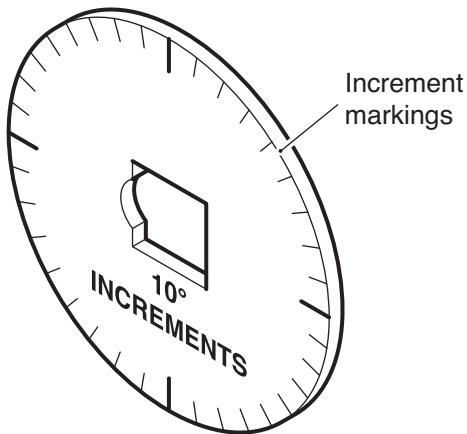
Note:

- 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 T3880105 to ensure accuracy when angle-tightening.

cbxt



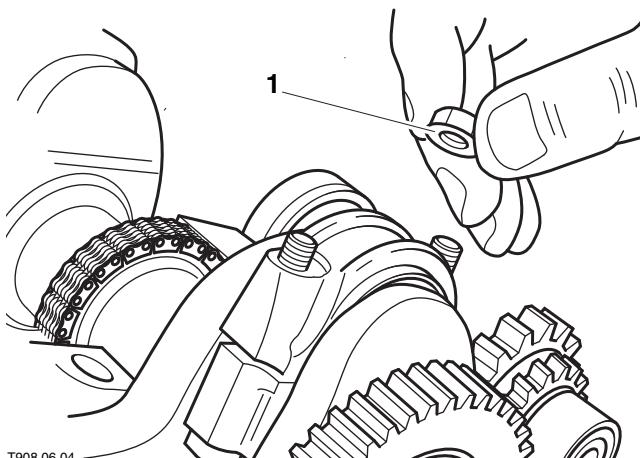
Service Tool T3880105



Caution

The procedure for tightening connecting rods secured with nuts and bolts and fracture split connecting rods secured only with bolts is different. Refer to the correct procedure as shown below/overleaf. 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.

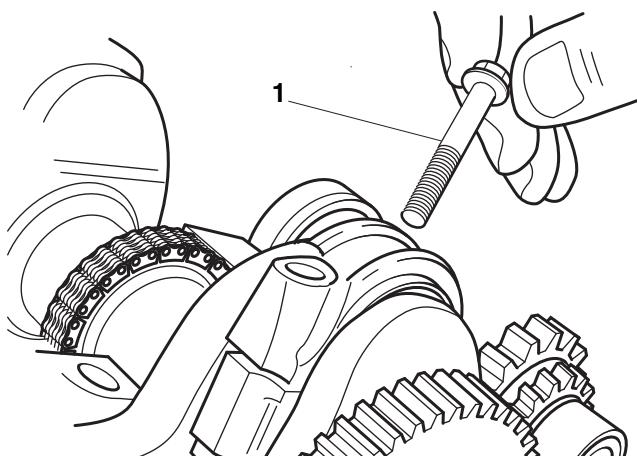
6. Where connecting rods are fitted with **nuts and bolts**, lubricate the threads and the face of the new nuts with molybdenum disulphide grease then fit the nuts to the big-end bolts.



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 (see page 7-6).

Big-end Bearing Shell Selection and Journal Clearance Check



Warning

Two different types of connecting rod have been fitted to America, America LT and Speedmaster models.

The two connecting rod types are not interchangeable and must be renewed as a set. Severe engine damage could result from mixing connecting rod types, leading to loss of motorcycle control and an accident.

Identification

America, America LT and Speedmaster models have had two different types of connecting rod installed during manufacture. The two connecting rod types can be identified as follows:

- The first type used during manufacture can be identified by its size marking - letter markings (A or B) or numerical markings (4 or 5) - with big ends secured with nuts and bolts.
- The second type has no size markings; and uses a fracture split big end secured only with bolts.

Shell selection - with big ends secured with nuts and bolts

- **Models up to engine number 197183.**
- **Models from engine number 253372 to 292625.**
- **Models from engine number 296931 onwards.**

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.

Crankshaft, Connecting Rods & Balancers

Models up to engine number 197183		
Models from engine number 253372 to 292625		
Models from engine number 296931 onwards		
	CRANKSHAFT JOURNAL DIAMETER	
ROD SIZE GROUP	40.946 mm to 40.953 mm	40.954 mm to 40.960 mm
A or 5	RED	WHITE
B or 4	BLUE	RED

Shell selection - fracture split big ends secured with bolts

- Models from engine number 197183 to 253371.
- Models from engine number 292626 to 296930.

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 to 253371		
Models from engine number 292626 to 296930		
		CRANKSHAFT JOURNAL DIAMETER
ROD SIZE GROUP	40.946 mm to 40.953 mm	40.954 mm to 40.960 mm
BEARING SHELL COLOUR		RED WHITE

Journal clearance check

1. The big-end bearing journal clearances are measured using *Plastigauge* (Triumph part number 3880150-T0301) as follows.

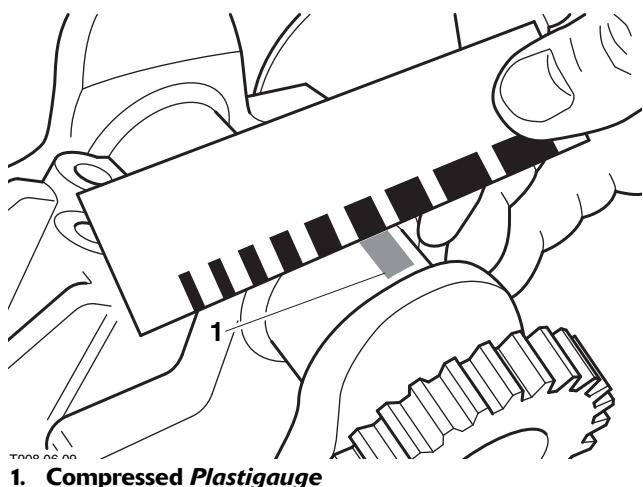
Note:

- 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 *Plastigauge* to fit across the crankshaft journal.
- e) Fit the *Plastigauge* 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 *Plastigauge* 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 *Plastigauge*, 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 *Plastigauge* kit, measure the width of the compressed *Plastigauge* to obtain the journal clearance.



Big-end bearing journal clearance:

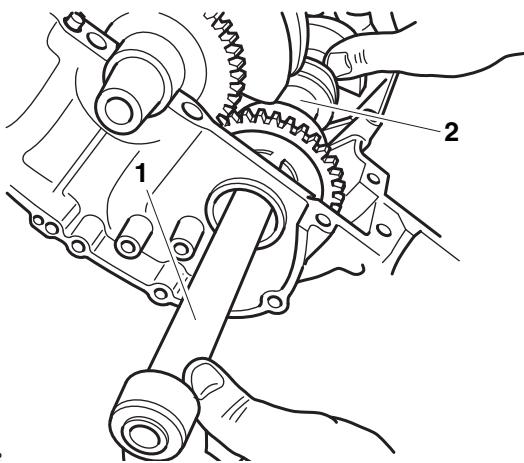
Standard	0.036 to 0.066 mm
Service limit	0.1 mm

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 (see page 7-5).
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.



- 1. Shaft**
2. Balancer

Note:

- **The front and rear balancers are different and are not interchangeable (see installation).**

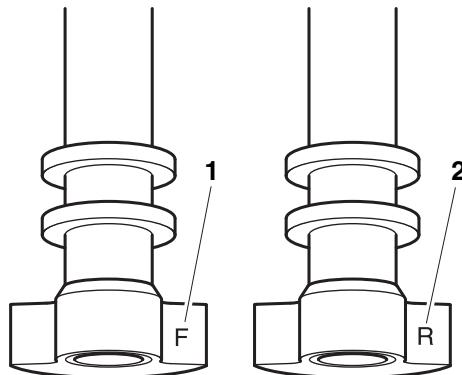
Inspection

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:

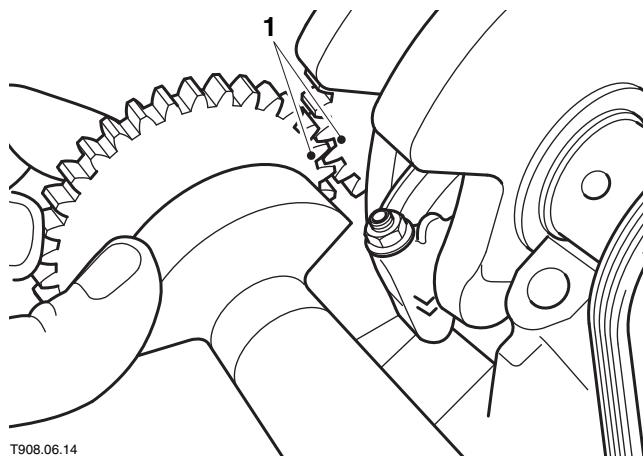
- **The front and rear balancers are different and are not interchangeable. Each balancer is stamped with an identification marking on the flat of its left hand end weight; the rear balancer is marked 'R' and the front balancer 'F'.**



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.



1. Timing marks

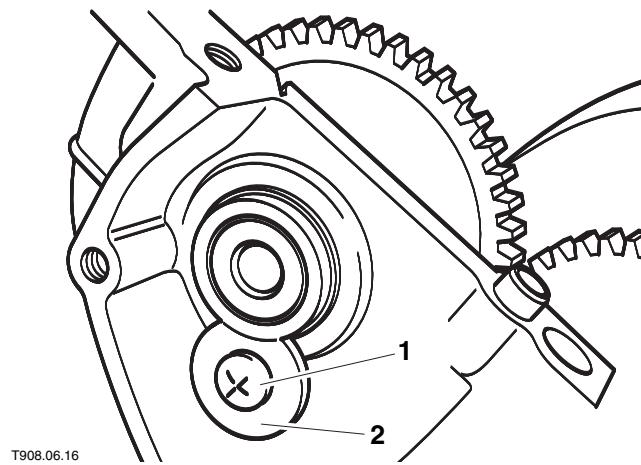
5. Insert the balancer shaft, positioning its locking washer cutout next to the retaining screw hole.
6. Slide the locking washer into the balancer shaft cutout then fit the wiring guide and new retaining screw. Ensure the pick-up coil wiring is correctly positioned behind the guide then tighten the screw to **12 Nm**.
7. Assemble the crankcase upper and lower halves (see page 7-6).

Crankshaft, Connecting Rods & Balancers

Front Balancer

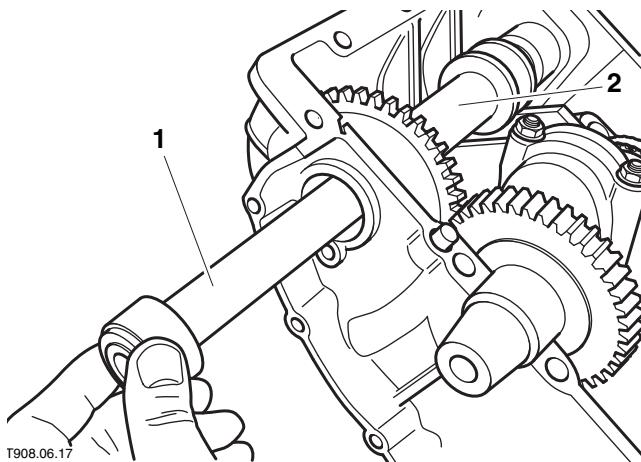
Removal

1. Disassemble the crankcase halves (see page 7-5).
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).

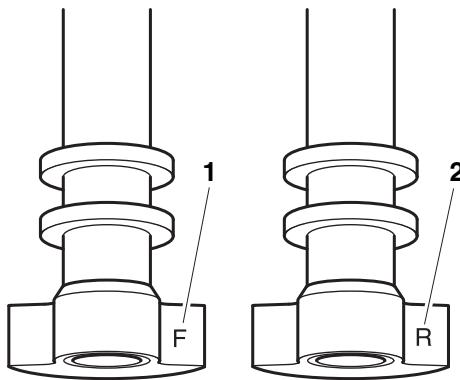
Inspection

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

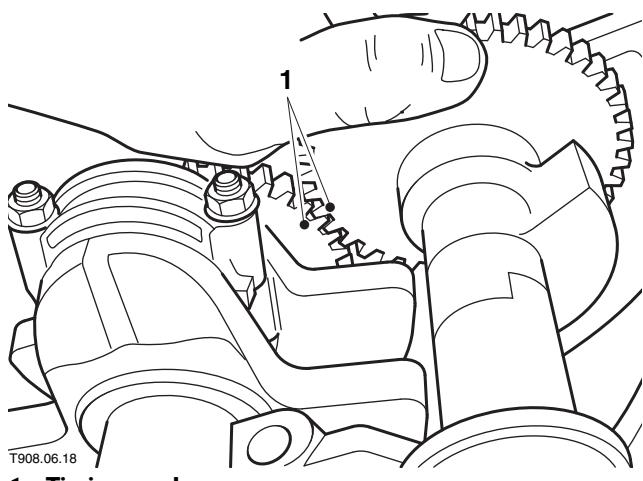
Note:

- 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'.



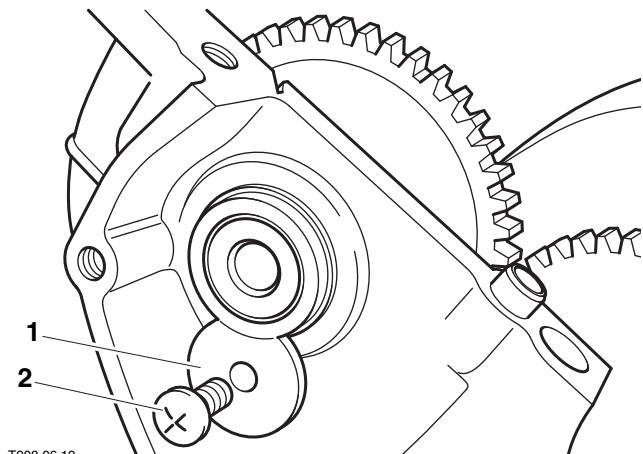
1. Front balancer marking
2. Rear balancer marking

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.



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**.



1. Locking washer

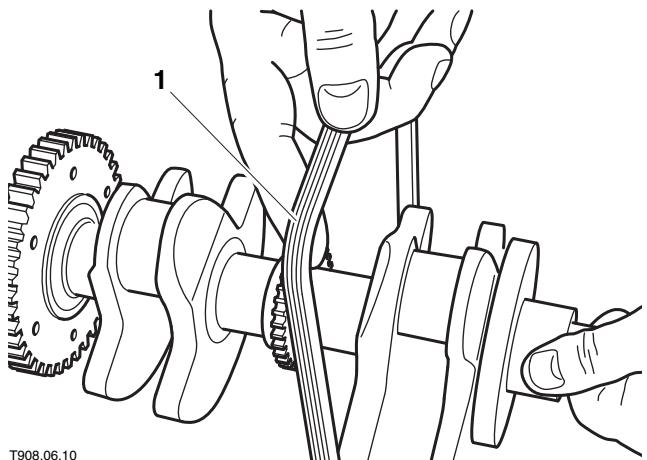
2. Retaining screw

7. Assemble the crankcase upper and lower halves (see page 7-6).

Cam Chain

Removal

1. Remove the crankshaft (see page 7-9).
2. Remove the cam chain from the crankshaft.

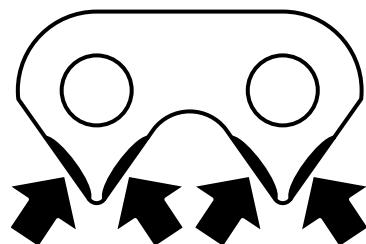


1. Cam chain

Inspection

Visual in-situ checks can also be made as follows:

1. Check for significant blue discolouration of the chain plates indicating excessive heat build-up.
2. Examine all pins for signs of rotation.
3. Check for cracking or deep scratching of the chain plates.
4. Check for severe wear of the inner plates as indicated in the diagram below.

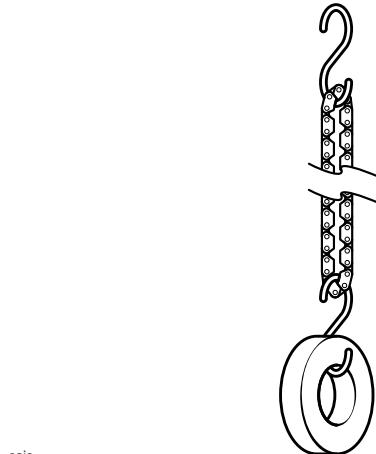


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Crankshaft, Connecting Rods & Balancers

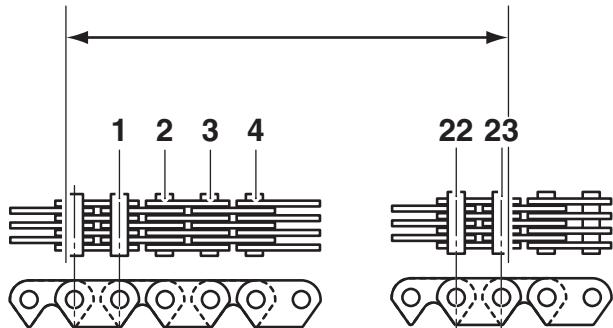
For a more thorough check, proceed as follows:

1. Remove the chain from the engine.
2. Suspend the chain from a pin or hook with a 13 kg weight attached at the lower end.



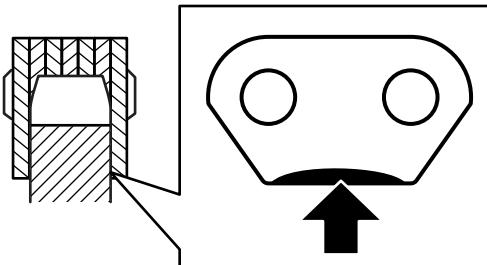
cajs

3. Measure across 23 pins, from the outer edge of the first pin to the outer edge of the 23rd, as shown in the diagram below. If the chain is within limits, the measurement should be no longer than 149.48 mm. Measurements beyond 149.48 mm indicate that the chain must be replaced.



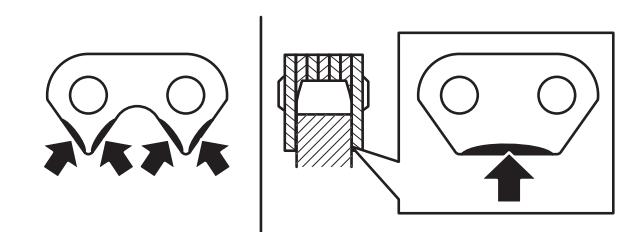
cajt

4. Check for severe wear of the inner surface of the outer plates at the side-contact points with the sprocket teeth.



ccru

5. Check for signs of stiffness or kinking.
6. Check for severe wear of the plates in the area shown below.



caju

If any of these symptoms are evident, the cam chain must be replaced.

Installation

1. Fit the cam chain to the crankshaft sprocket.
2. Refit the crankshaft (see page 7-10).

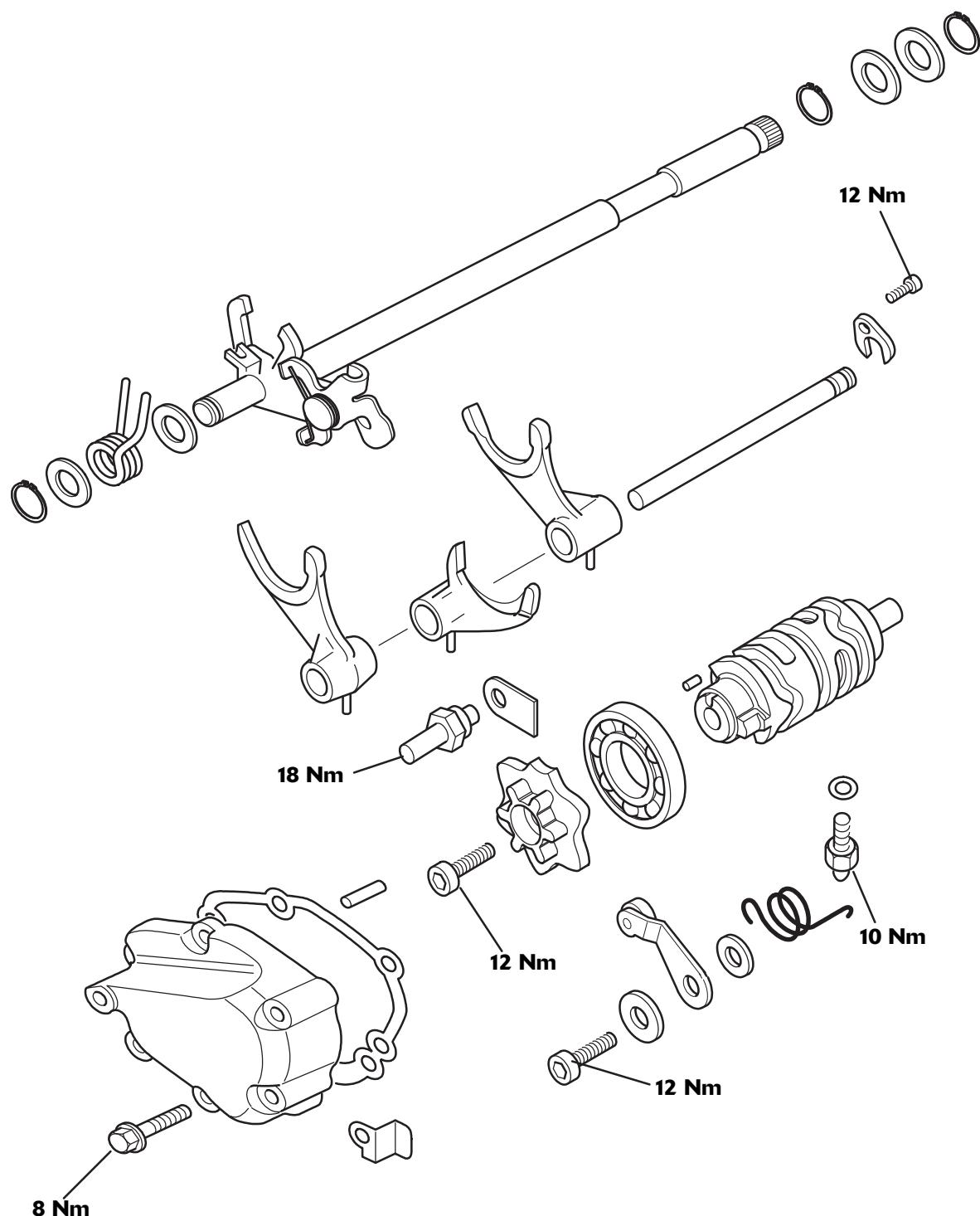
8 Transmission

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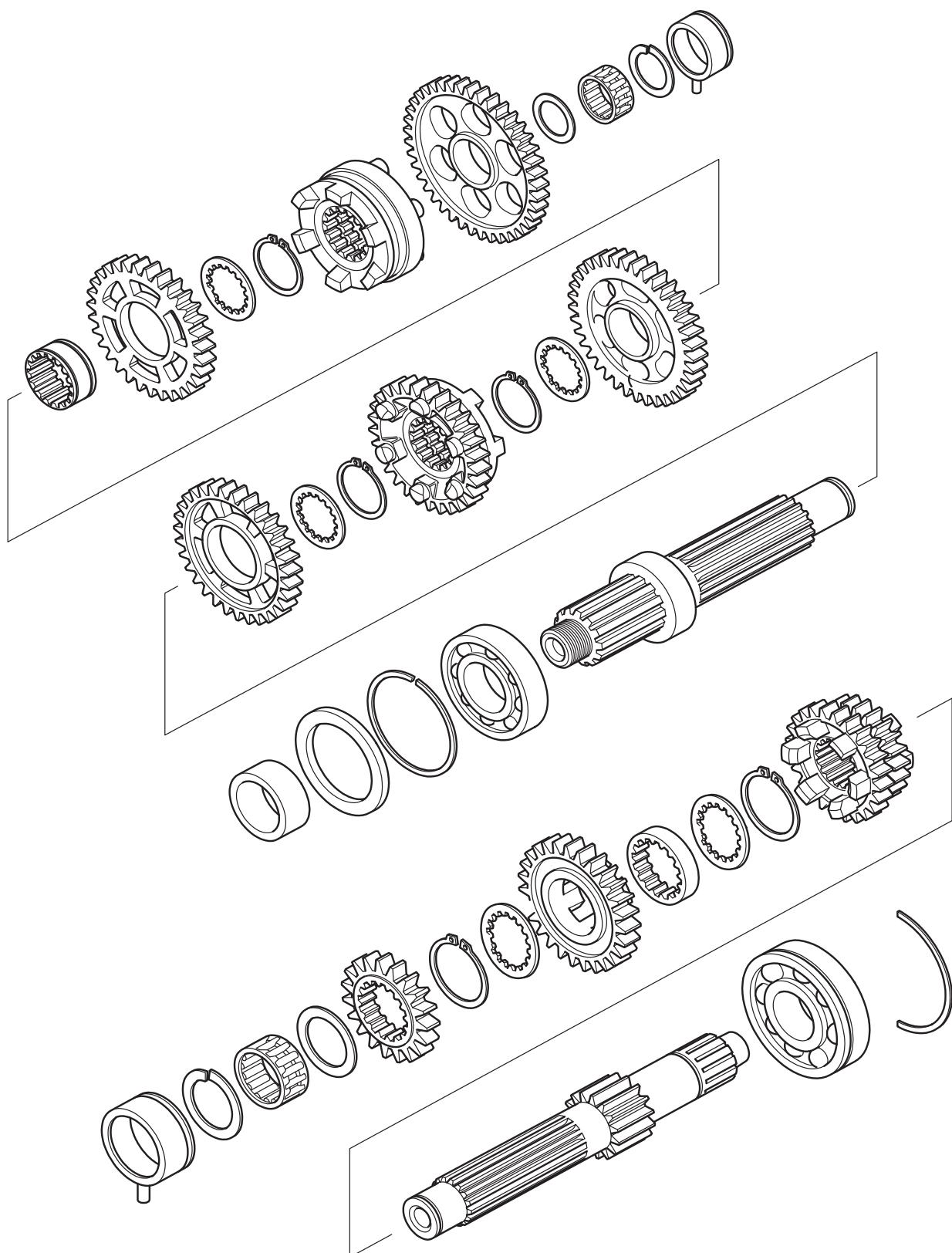
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Transmission

Exploded View - Gearchange and Selector Mechanism Components



Exploded View - Transmission Shafts



Transmission

Gearchange Shaft



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.

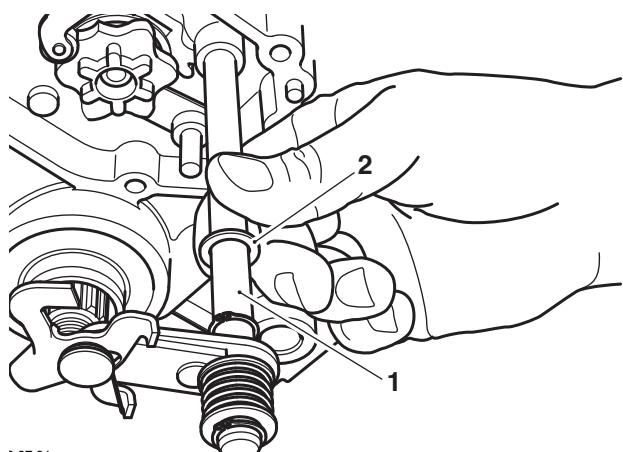
A locked transmission will lead to locking of the rear wheel causing loss of motorcycle control and an accident.

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

- Remove the clutch (see page 5-9).
- Remove the front sprocket (see page 14-8).
- Clean the area around the gearchange mechanism cover.
- Slacken and remove the gearchange mechanism cover bolts, noting the correct location of the wiring clamp.
- Remove the gearchange mechanism cover, taking care not to lose the locating pins. Discard the gasket.
- Remove the circlip and washer from the left hand end of the gearchange shaft.
- Slide out the gearchange shaft complete with the second washer.



3.07.01

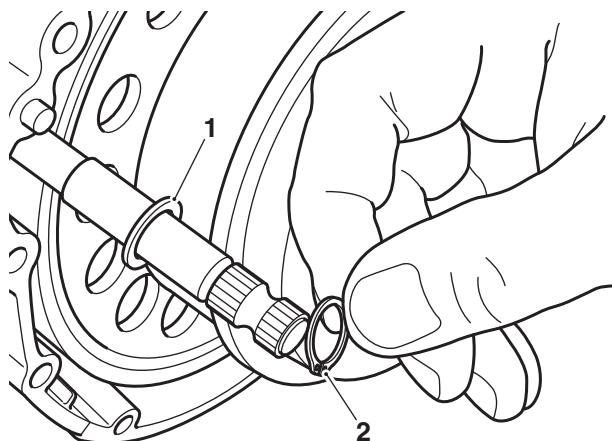
1. Gearchange shaft
2. Washer

Inspection

- 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

- Ensure the detent arm is correctly installed and the gearchange shaft centralising pin is tightened to the specified torque.
- 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.
- 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.

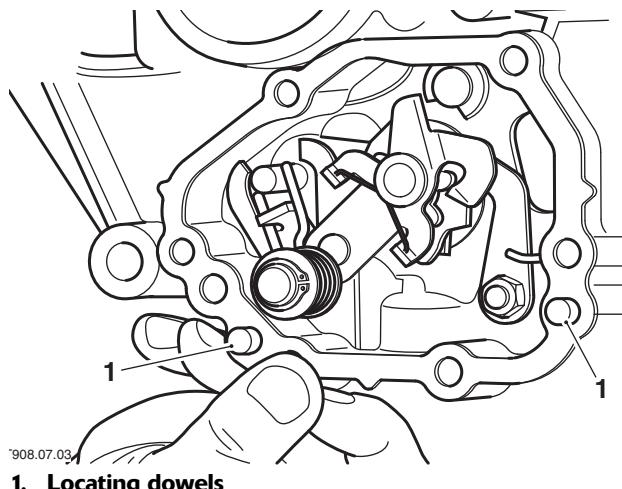


8.07.02

1. Washer

2. Circlip

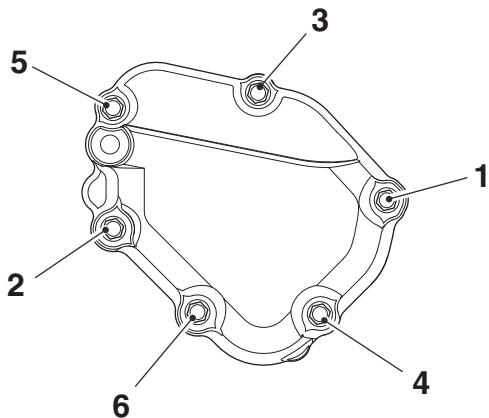
4. Check the operation of the gearchange mechanism.
5. Ensure the locating dowels are in position then fit a new gasket.



908.07.03

1. Locating dowels

6. Fit the gearchange mechanism cover, ensure the wiring clip is fitted to the correct bolt.
7. Tighten fixings 1 to 6 in the sequence shown below to **8 Nm**.
8. Re-tighten fixings 1 and 2 to **8 Nm**.



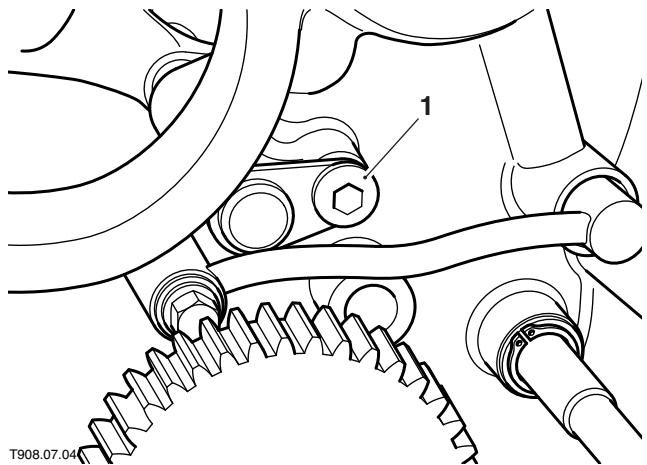
Gearchange Mechanism Cover Tightening Sequence

9. Install the front sprocket (see page 14-9).
10. Refit the clutch and clutch cover (see page 5-7).

Selector Forks

Removal

1. Disassemble the crankcase halves (see page 7-5).
2. Remove the screw and slide out the retaining plate from the left hand end of the selector fork shaft. Discard the screw.

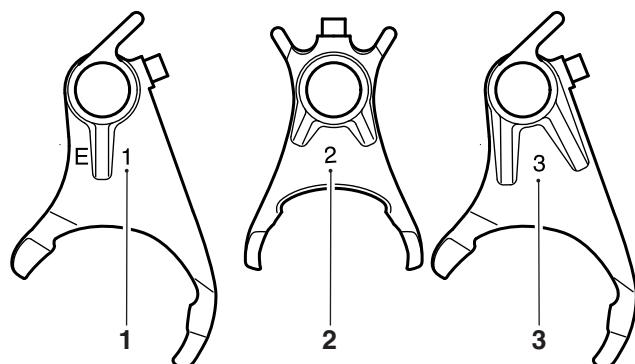


1. Retaining plate screw

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.

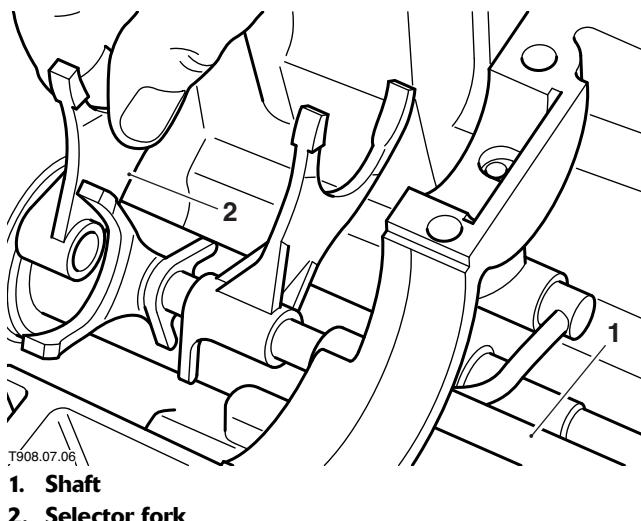


T908.07.05 Selector Fork Marking (Up To Engine Number 128237)

1. Left fork marking (up to engine number 128237)
2. Centre fork marking
3. Right fork marking

Transmission

- Slide out the shaft and lift out each selector fork as it is released from the shaft end.



Inspection

- 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

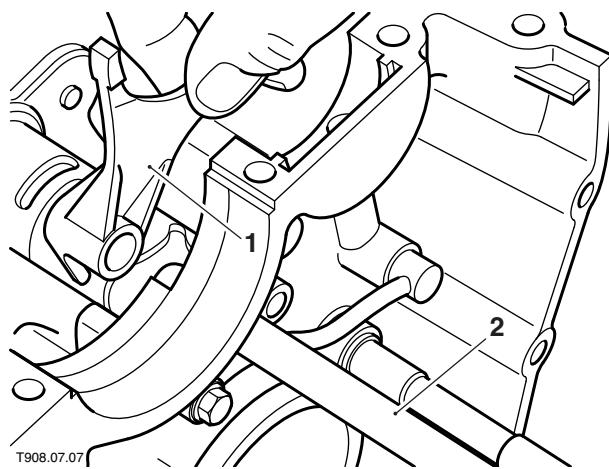
Standard	5.80 to 5.90 mm
Service limit	5.70 mm

Installation

Note:

- The selector forks are all different and are not interchangeable.
- Always assemble the transmission in neutral.

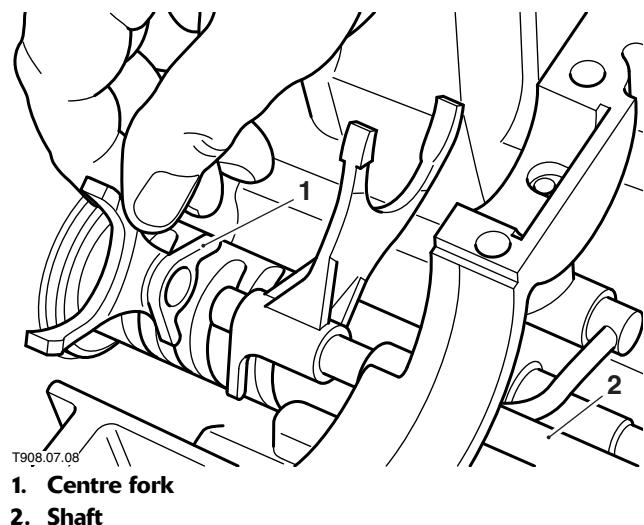
- Fit the selector fork shaft to the crankcase, ensuring its slotted end is facing left.
- Fit the left hand selector fork to the drum in the orientation previously noted. Slide the shaft into the fork.



1. Left selector fork

2. Shaft

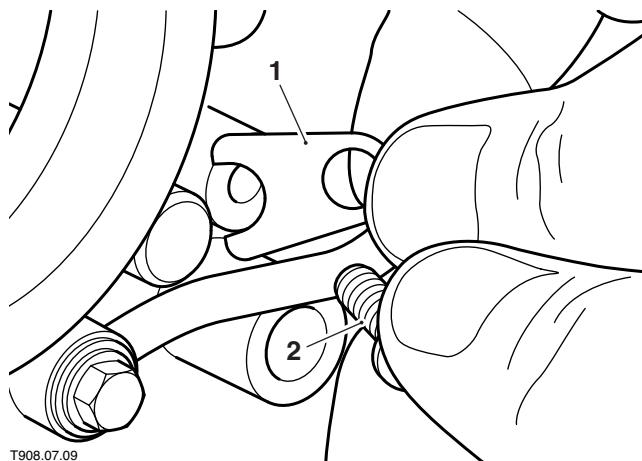
- Fit the centre selector fork to the drum in the orientation previously noted. Slide the shaft into the fork.



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**.



T908.07.09
1. Retaining plate
2. Screw

7. Reassemble the crankcase halves (see page 7-6).

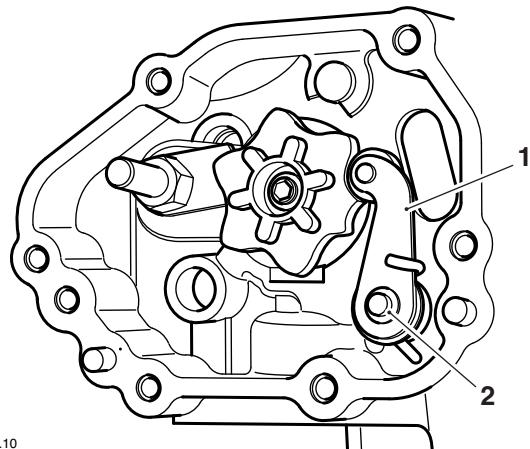
Selector Drum

Removal

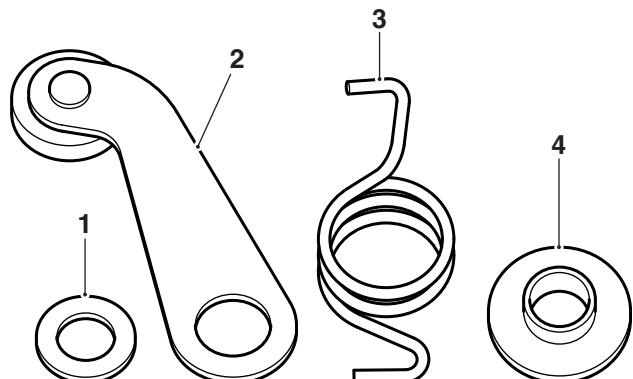
Note:

- **The detent arm components can be removed without disassembling the crankcase halves (if required).**

1. Disassemble the crankcase halves (see page 7-5).
2. Remove the gearchange shaft (see page 8-4).
3. Remove the selector forks (see page 8-5).
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.

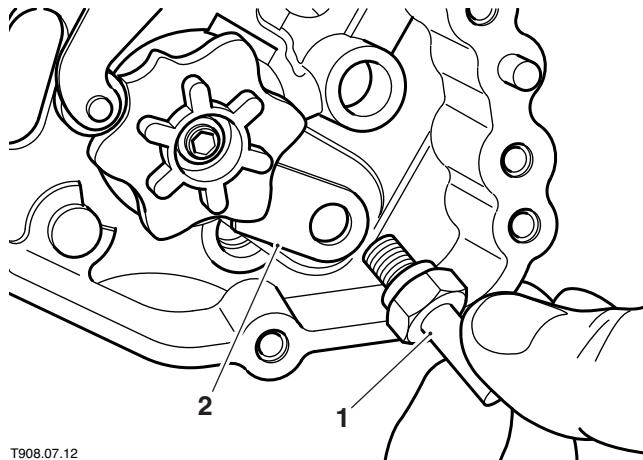


T908.07.11
1. Washer
2. Detent arm
3. Spring
4. Shouldered collar

Transmission

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

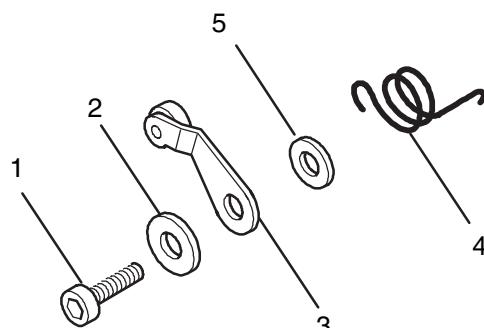
1. Manoeuvre the selector drum into position in the crankcase then fit the bearing.
2. Fit the selector cam. Ensure the cam is correctly engaged with the pin then fit a new bolt, prevent the drum from turning as for removal, and tighten the new bolt to **12 Nm**.
3. Engage the retaining plate with the drum bearing then refit the centralising pin. Tighten the pin to **18 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. Apply ThreeBond 1305 to threads and install a 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

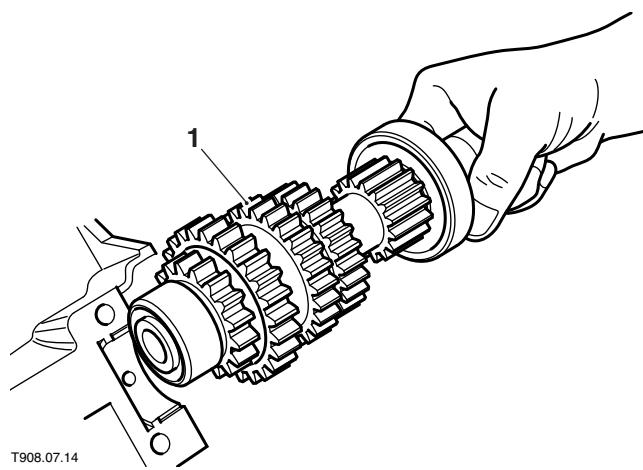
5. Washer

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 (see page 8-6) and gearchange shaft (see page 8-4).
10. Reassemble the crankcase halves (see page 7-6).

Transmission Shafts

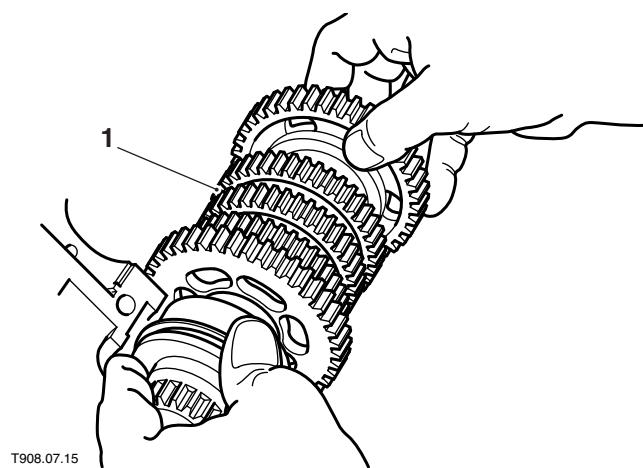
Removal

1. Disassemble the crankcase halves (see page 7-5).
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.



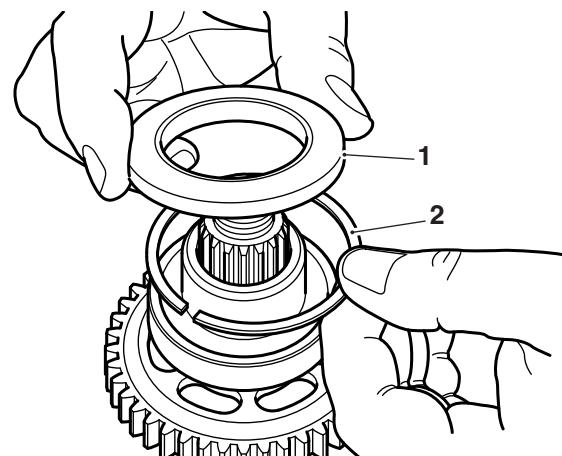
1. Input shaft

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.

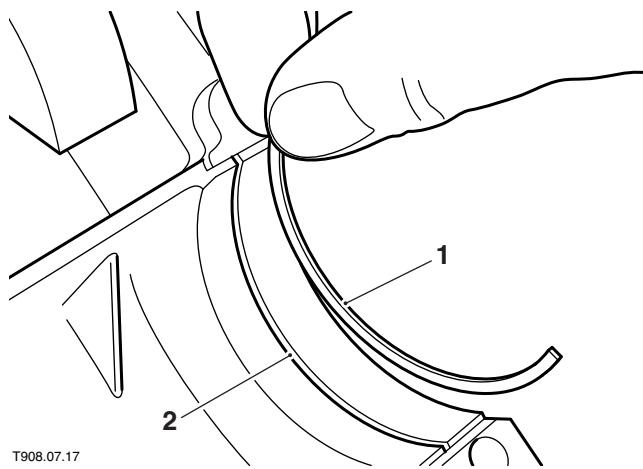
Installation

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.

Transmission

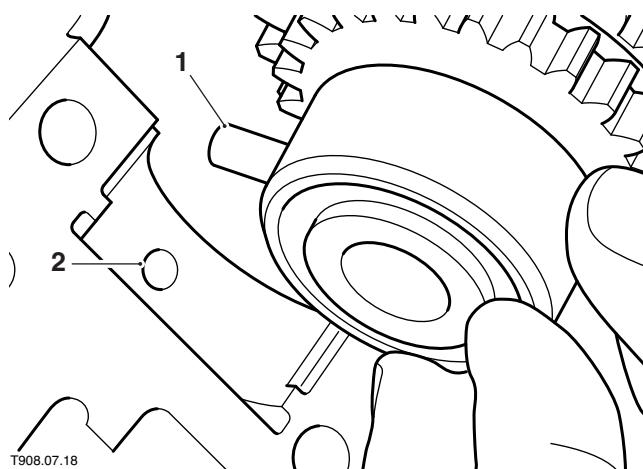
- Fit the input shaft bearing half-ring to its groove in the crankcase.



T908.07.17

- Half-ring
- Crankcase groove

- 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.



T908.07.18

- Outer race pin
- Crankcase hole

- Ensure both the output and input shafts are correctly seated and their gears are correctly meshed before assembling the crankcase halves (see page 7-6).

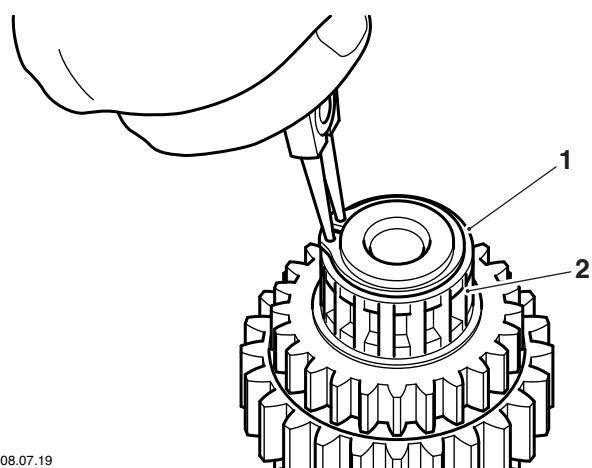
Input Shaft

Note:

- Note the orientation of all components as they are removed from the shaft. The same orientation must be retained on assembly.

Disassembly

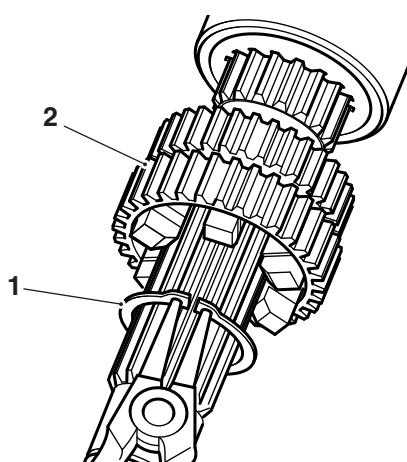
- Remove the input shaft from the crankcase (see page 8-9).
- Remove the bearing outer race from the right end of the shaft.
- Remove the circlip then slide off the needle roller bearing.



T908.07.19

- Circlip
- Needle roller bearing

- Remove the washer followed by the 2nd gear.
- Remove the circlip then slide off the splined washer.
- Remove the 5th gear then slide off its splined bush and splined washer.
- Remove the circlip and slide off the combined 3rd/4th gear.



T908.07.20

- Circlip
- 3rd/4th gear

- To separate the input shaft and bearing, support the bearing then press out the shaft.

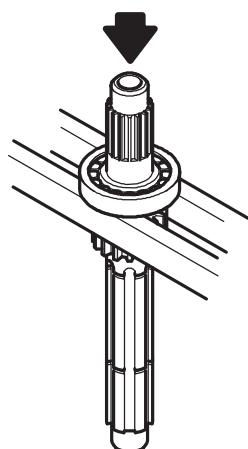
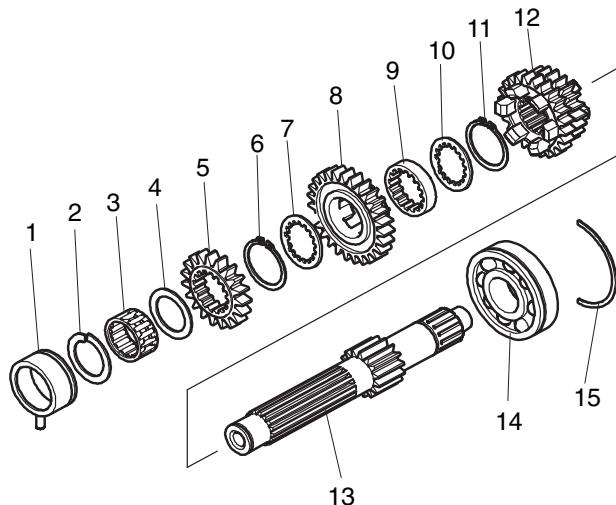
Note:

- 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.

Assembly**Pressing Off The Input Shaft Bearing**

06.12-1

Inspection

- 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.

Input Shaft Components

- Outer race
- Circlip
- Needle roller bearing
- Washer
- 2nd gear
- Circlip
- Splined washer
- 5th gear
- 5th gear splined bush
- Splined washer
- Circlip
- 3rd/4th gear
- Input shaft
- Bearing
- 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.**
- Support the inner race of the new bearing, ensuring its ring groove is facing upwards.
- 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.

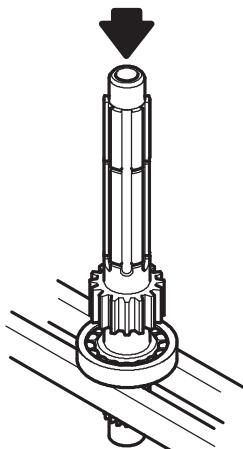
Transmission



Warning

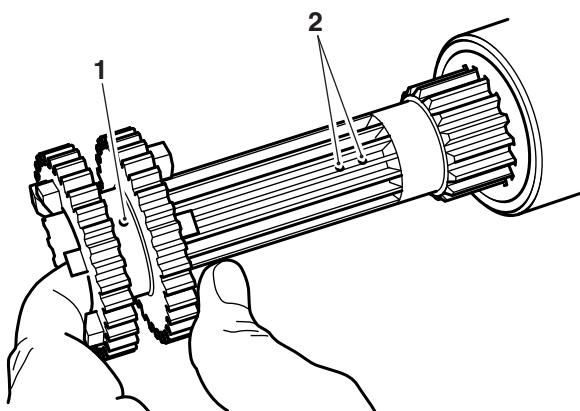
When using a press, always wear overalls, eye, face and hand protection. Objects such as bearings can break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

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

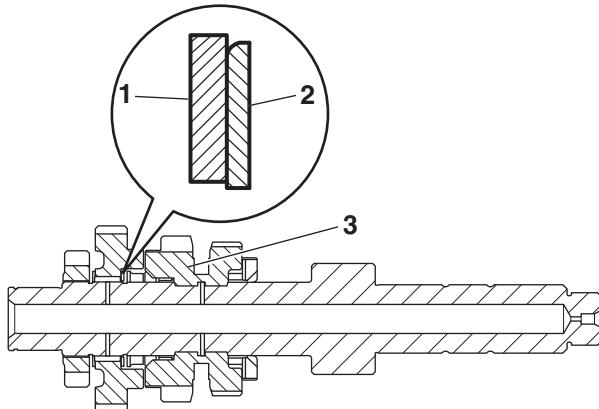
4. Fit the combined 3rd/4th gear with its smaller 3rd gear facing the integral 1st gear. Ensure that, when engaging the gear with the shaft splines, the oil hole in the gear DOES NOT ALIGN with the oil holes in the shaft.



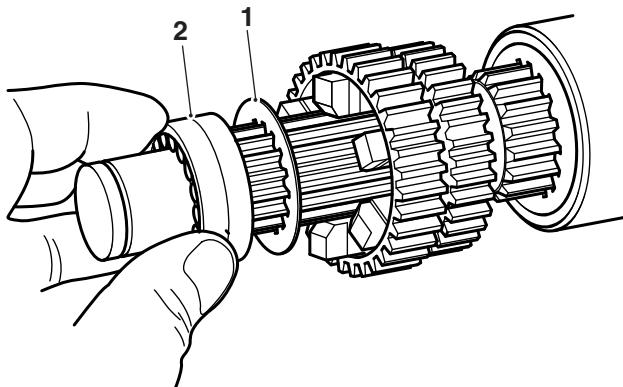
T908.07.21

1. 3rd/4th gear oil hole
2. Shaft oil holes

5. Secure the 3rd/4th gear in position with a new circlip, orientating the circlip as shown below.



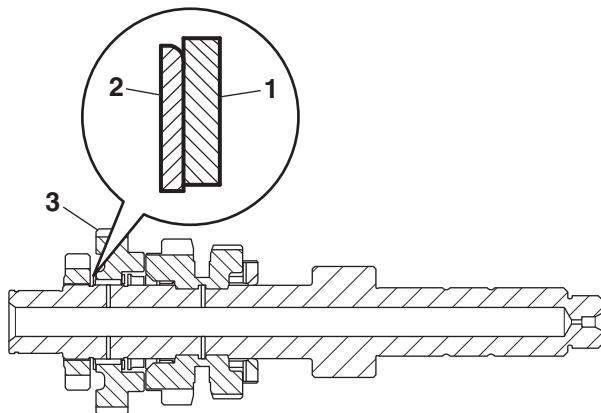
1. Splined washer
2. Circlip
3. 3rd/4th gear
6. Fit the splined washer then slide on the 5th gear splined bush taking care to ALIGN THE OIL HOLE IN THE SHAFT WITH THE CORRESPONDING HOLE IN THE BUSH.



T908.07.22

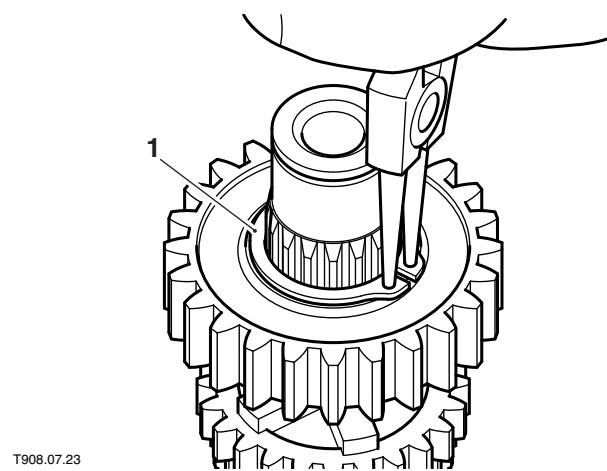
1. Splined washer
2. 5th gear splined bush
7. Fit the 5th gear with its dogs facing the 3rd/4th gear and locate it on the bush.

8. Fit a splined washer and secure 5th gear in position with a new circlip, orientating the circlip as shown below.

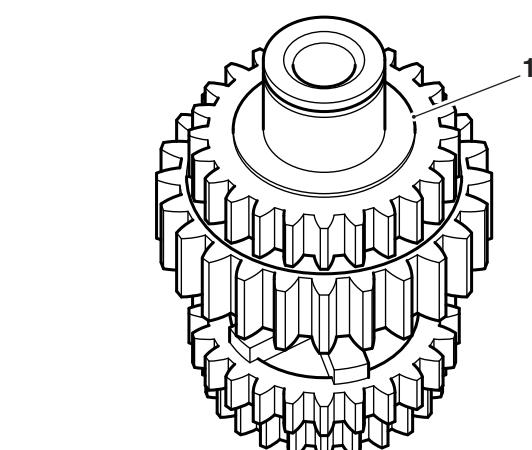


ccqi

1. Splined washer
2. Circlip
3. 5th gear



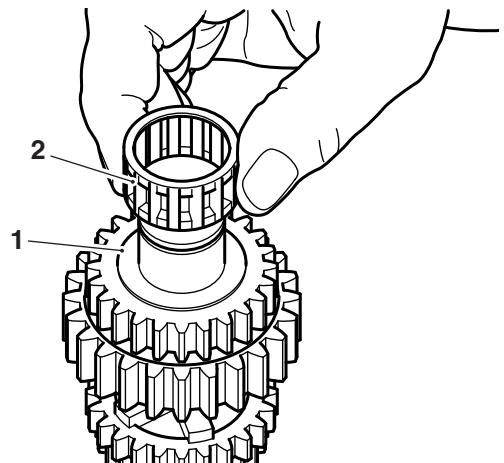
- T908.07.23
- 1. Circlip**
 9. Fit the 2nd gear with its side with the slight protrusion facing away from the 5th gear.



T908.07.24

1. 2nd gear protrusion

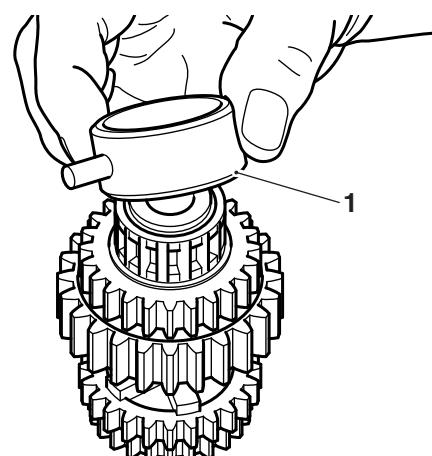
10. Slide on the washer and fit the needle roller bearing.



T908.07.25

1. Washer
2. Needle roller bearing

11. Secure the needle roller bearing in position with a new circlip. Ensure the circlip is correctly located in the shaft groove.
 12. Fit the outer race to the needle roller bearing ensuring its chamfered edge is facing outwards.



T908.07.26

1. Outer race chamfered edge

Transmission

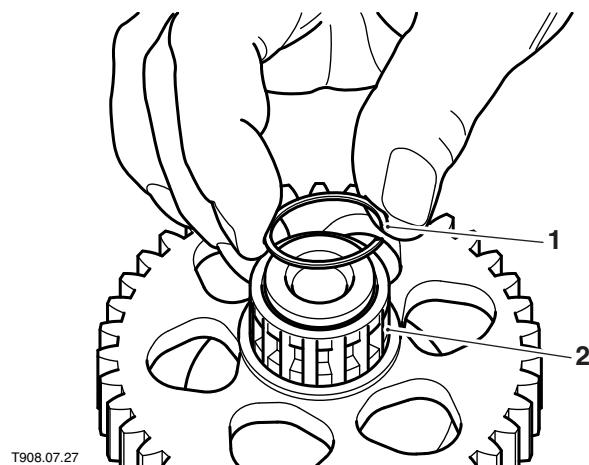
Output Shaft

Note:

- Note the orientation of all components as they are removed from the shaft. The same orientation must be retained on assembly.**

Disassembly

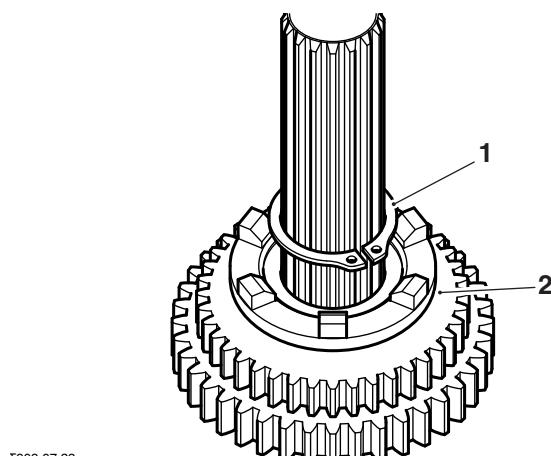
- Remove the output shaft from the crankcase (see page 8-9).
- Remove the bearing outer race from the left end of the shaft.
- Remove the circlip then slide off the needle roller bearing.



1. Circlip

2. Needle roller bearing

- Remove the washer followed by the 1st gear.
- Slide off 1st/3rd gear selector.
- Remove the circlip then slide off the splined washer.
- Remove the 3rd gear followed by the 4th gear then slide off the 3rd/4th gear splined bush and splined washer.
- Remove the circlip and slide off the 5th gear.



1. Circlip

2. 5th gear

- Remove the circlip and splined washer then slide off the 2nd gear.
- 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.**



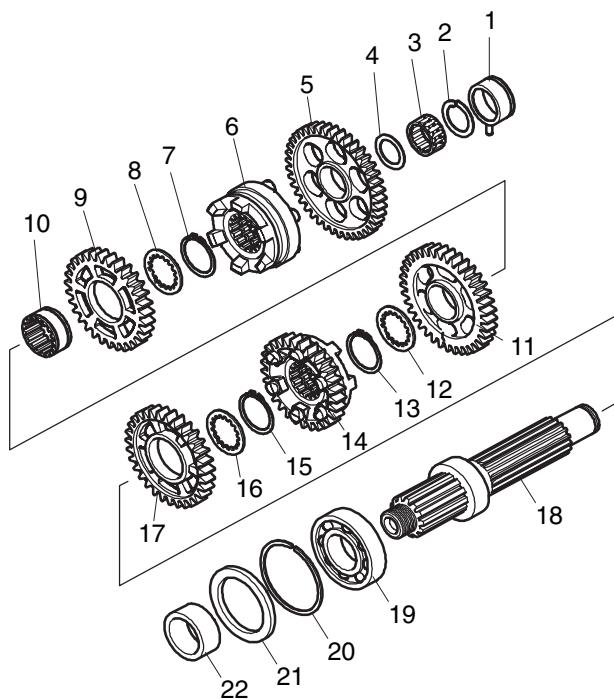
Warning

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

- 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.

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:

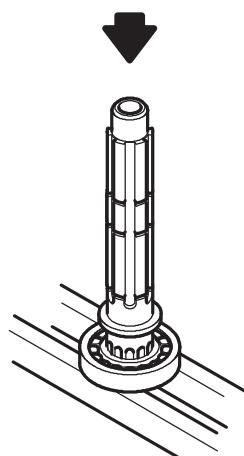
- Lubricate each gear and bush with clean engine oil during assembly.
- The circlips used on the output shaft have a flat side and an angled side. Illustrations throughout the assembly text indicate which way the angled side should face.
- Always assemble the transmission in neutral.

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.

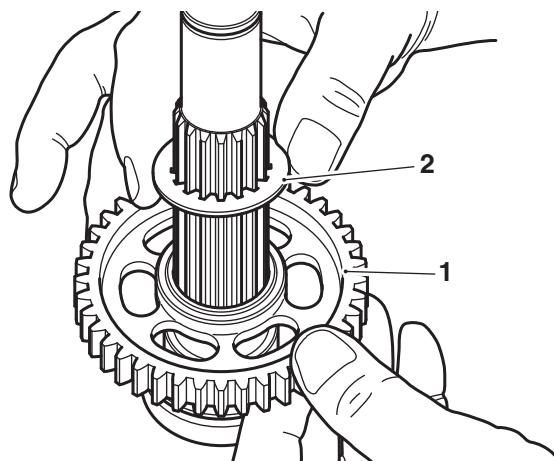
Warning

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.

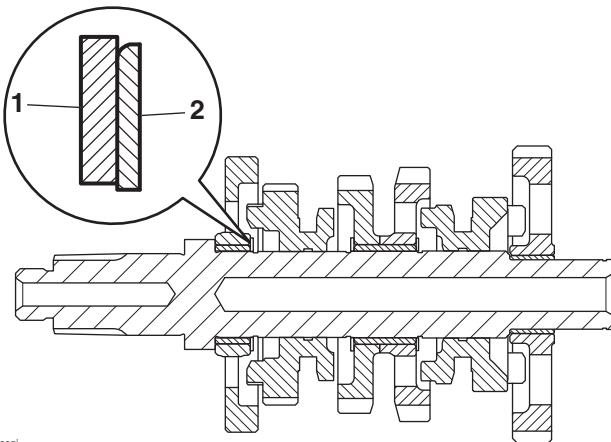


T908.07.29

1. 2nd gear
2. Splined washer

Transmission

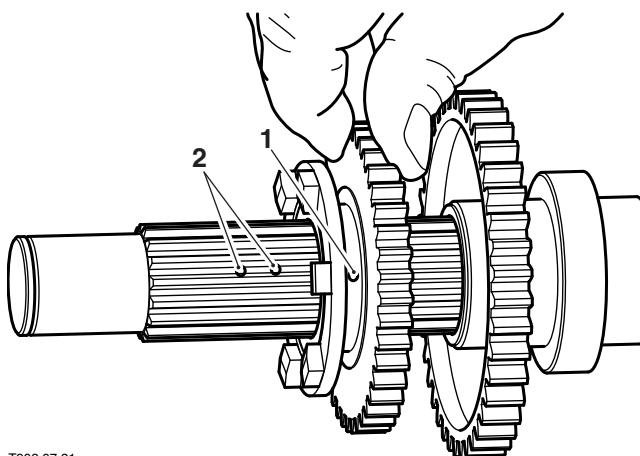
4. Fit the splined washer and secure it in position with a new circlip, orientating the circlip as shown below.



ccqj

1. Splined washer
2. Circlip

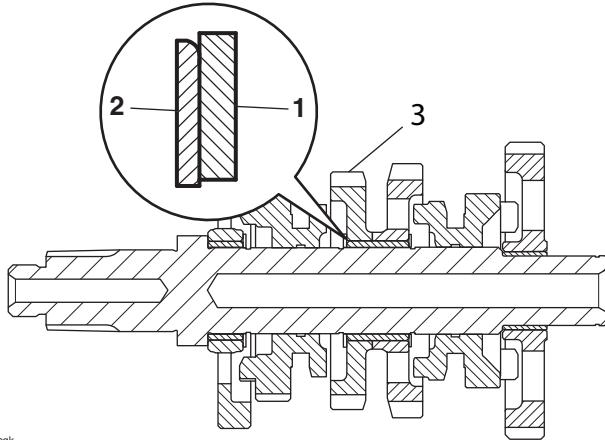
5. Fit the 5th gear with its selector fork groove facing away from the 2nd gear. Ensure that, when engaging the gear with the shaft splines, the oil holes in the gear DO NOT ALIGN with the oil holes in the shaft.



T908.07.31

1. 5th gear oil hole
2. Shaft oil holes

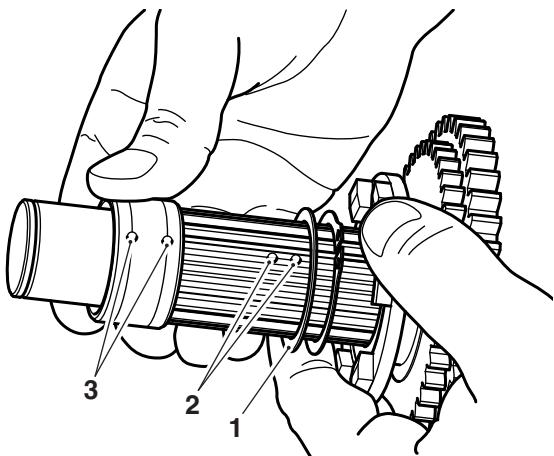
6. Fit a new circlip, orientating the circlip as shown below.



ccqk

1. Splined washer
2. Circlip
3. 5th gear

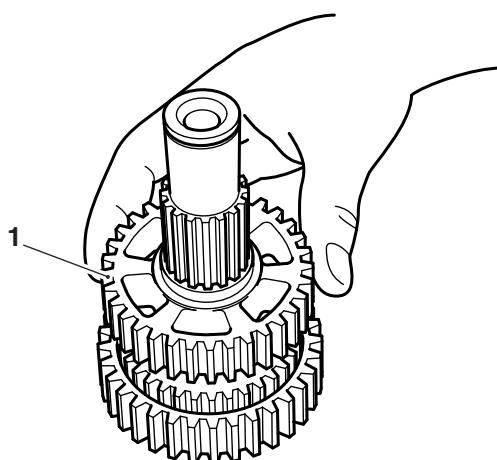
7. Fit the splined washer then slide on the 3rd/4th gear splined bush taking care to ALIGN the oil hole in the shaft with the corresponding hole in the bush.



T908.07.32

1. Splined washer
2. Shaft oil holes
3. 3rd/4th gear bush oil holes

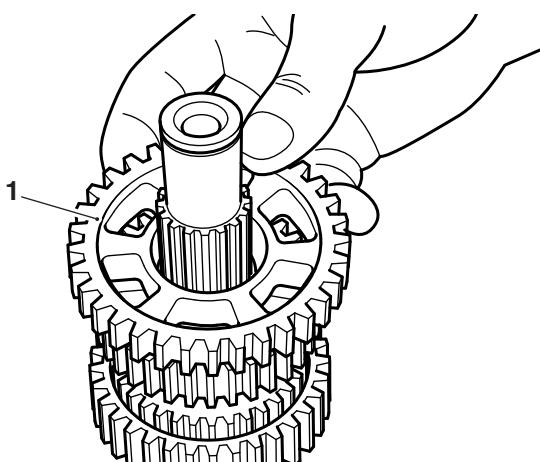
8. Slide the 4th gear onto the bush so its raised hub faces away from 5th gear.



T908.07.33

1. 4th gear

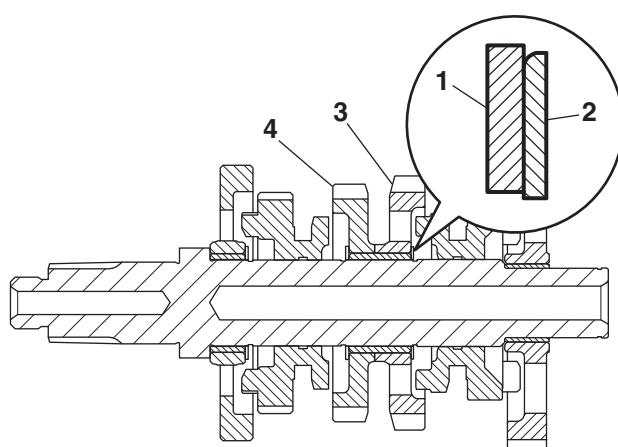
9. Fit the 3rd gear onto the bush with its raised hub facing towards 4th gear.



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.



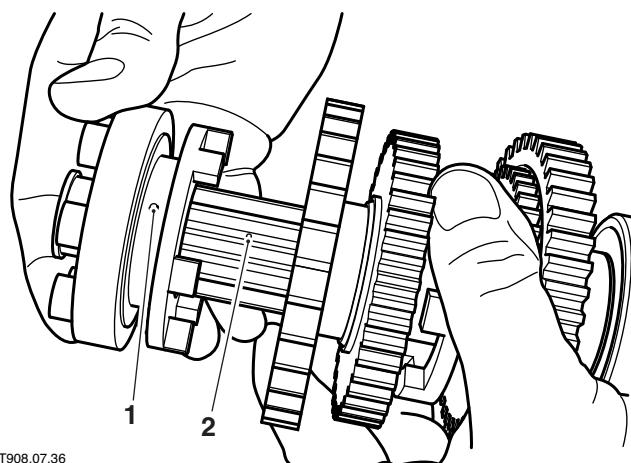
cqm
1. Splined washer

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.

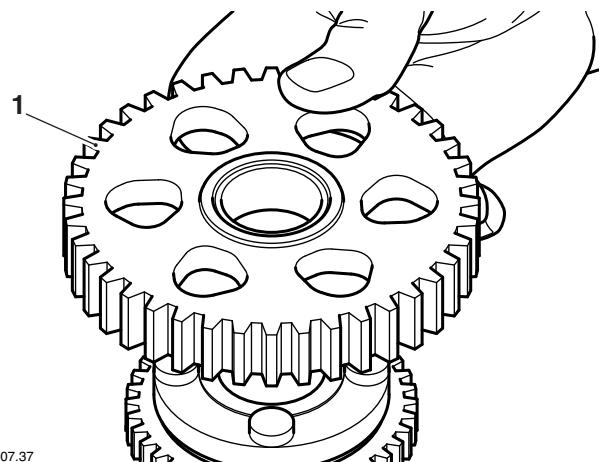


T908.07.36

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.

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9 Lubrication System

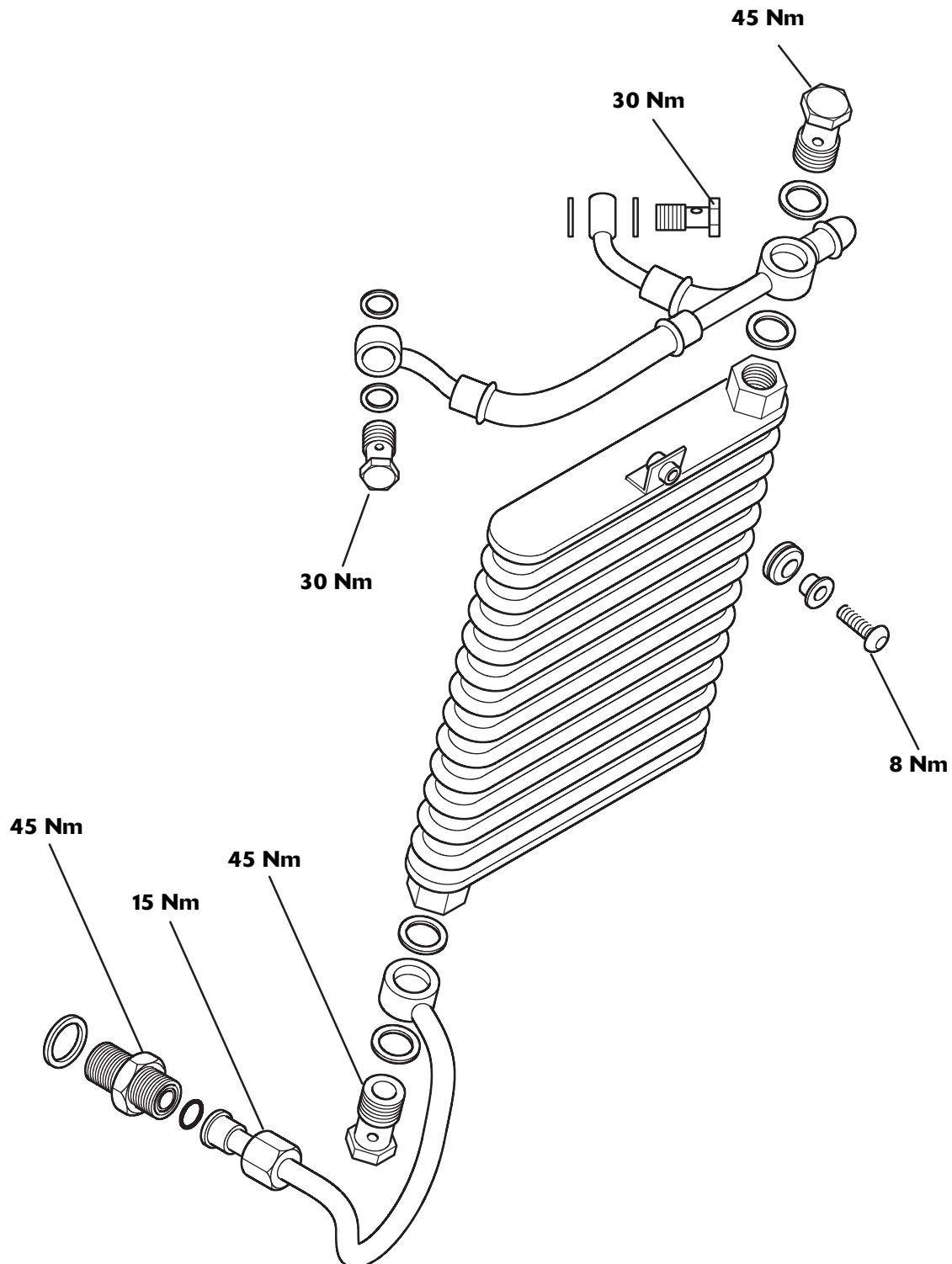
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Lubrication System

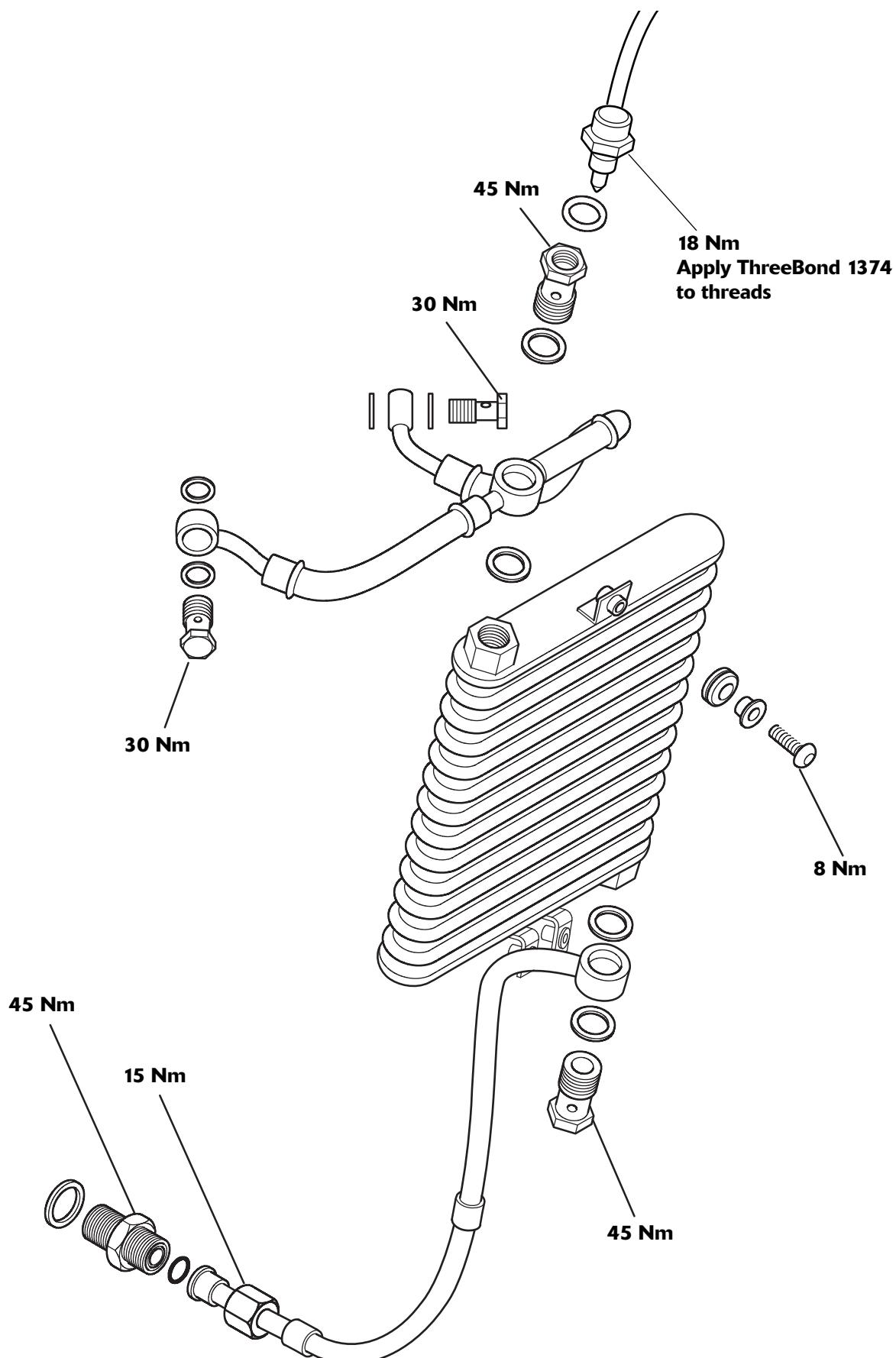
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Exploded View - Oil Cooler and Fittings - Carburettor Models

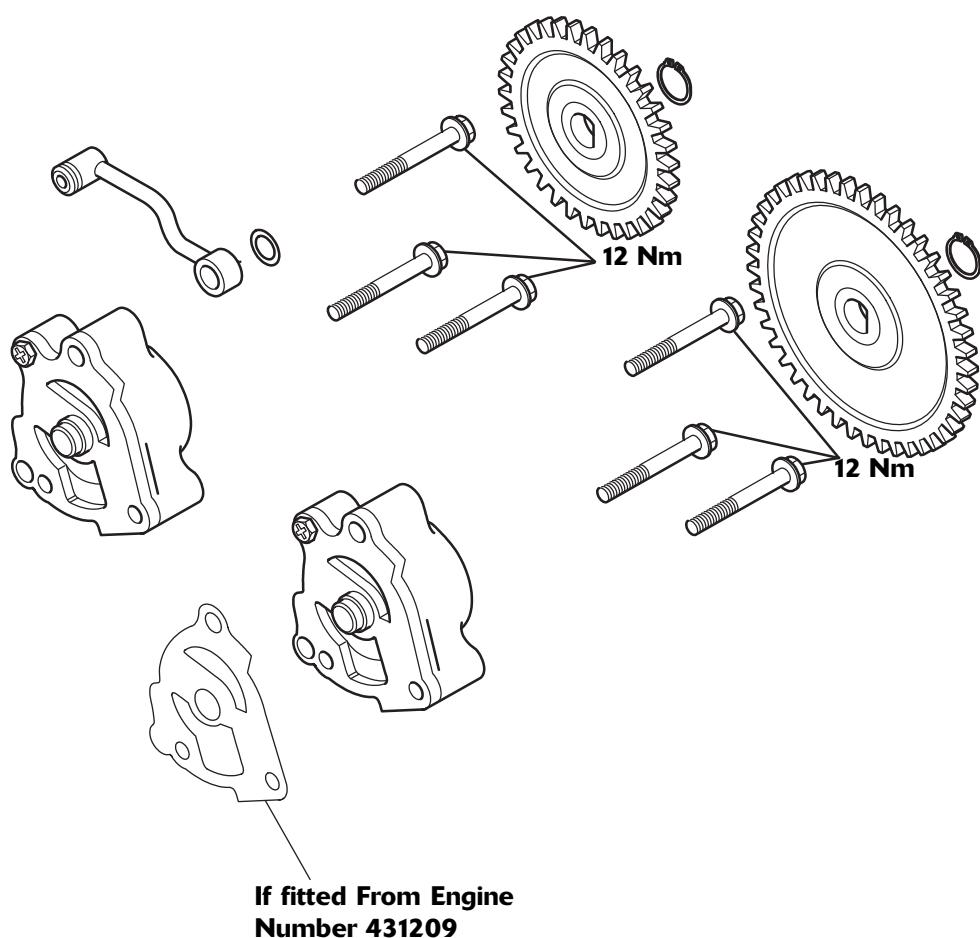


Lubrication System

Exploded View - Oil Cooler and Fittings - Fuel Injected Models

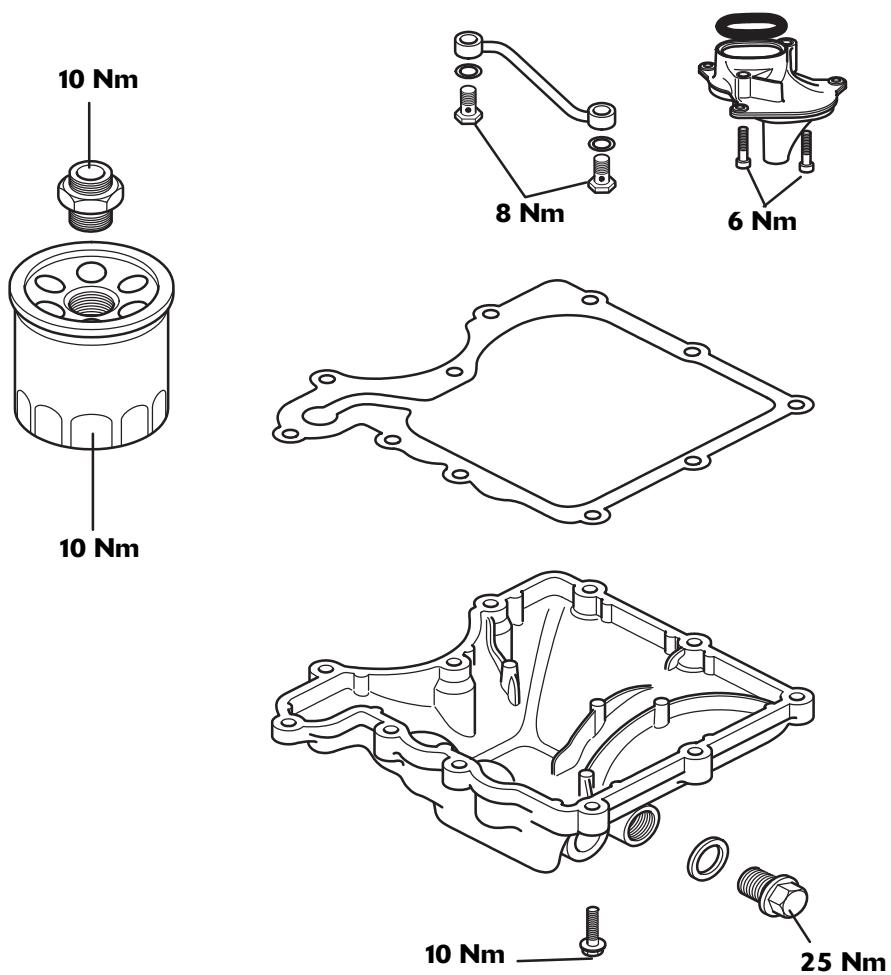


Exploded View - Oil pumps



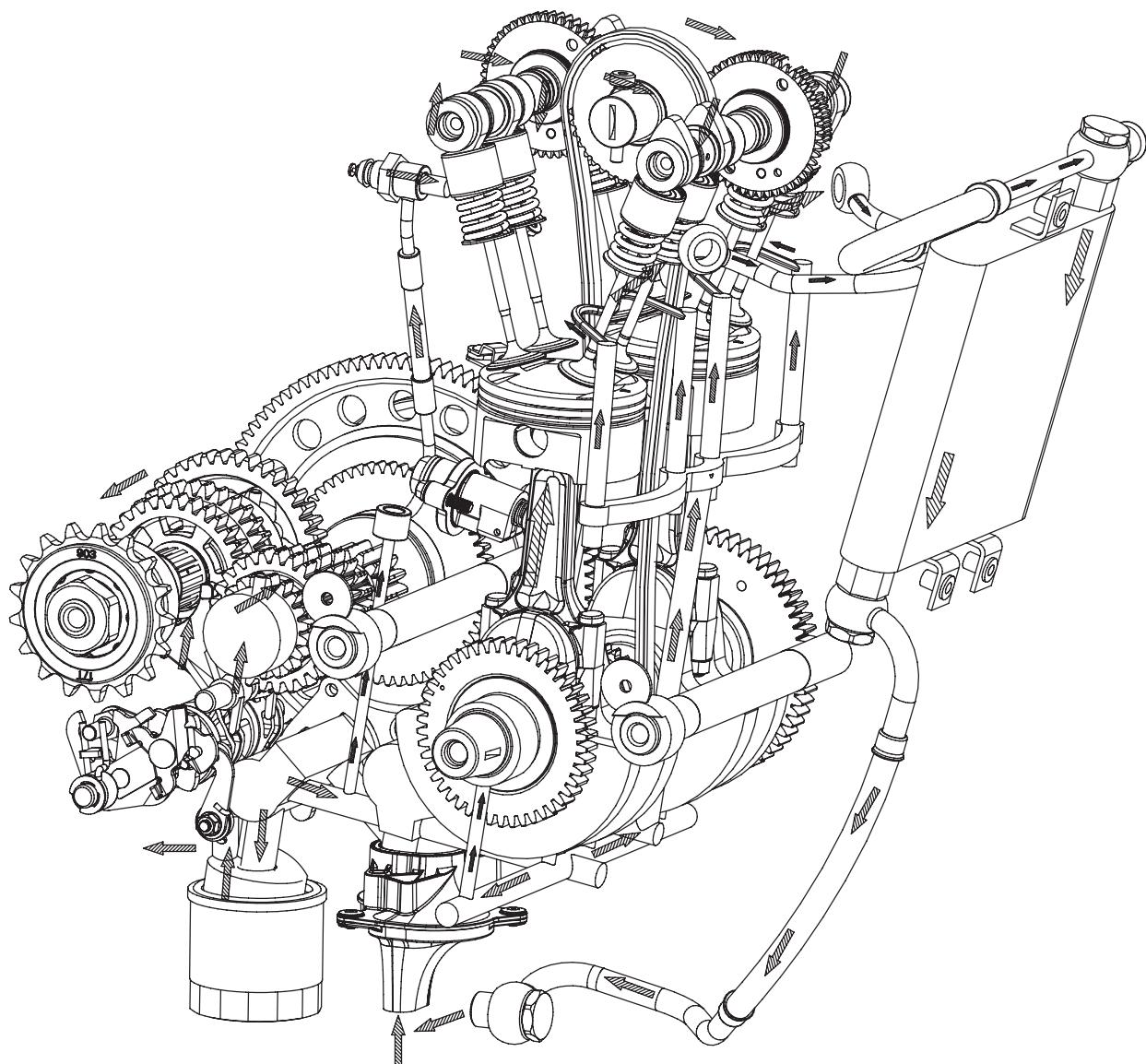
Lubrication System

Exploded View - Sump and Oil Filter



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.



Lubrication System

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 Castrol Power 1 Racing 4T (sold as Castrol Power RS Racing 4T in some countries).



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.

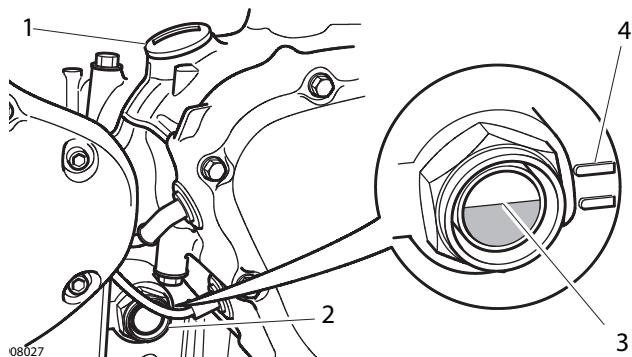
Castrol Power 1 Racing 4T (sold as Castrol Power RS Racing 4T in some countries) consistently performed well during our tests and has become our primary recommendation for the lubrication of all current Triumph motorcycle engines.

Castrol Power 1 Racing 4T (sold as Castrol Power RS Racing 4T in some countries), 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.
- Start the engine and run at idle for approximately five minutes.
 - Stop the engine, then wait for at least three minutes to allow the oil to settle.
 - Ensure the motorcycle is level and upright then check the oil level in the inspection window on the right hand side of the crankcase.
 - The oil level must be in-between the upper and lower level marks located at the side of the window.



- Oil filler cap
- Oil level inspection window
- Oil level (correct level shown)
- Level marks

- 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.

- Once the level is correct, securely refit the filler cap and O-ring to the crankcase.

Oil Draining & 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

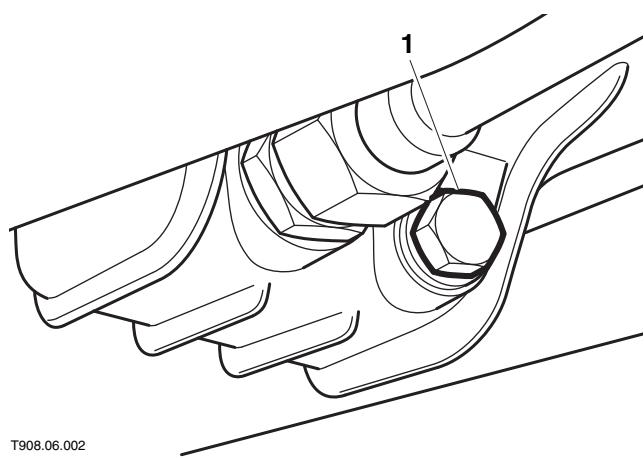
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

- If the engine has been running, allow it to stand for a few minutes to allow the oil and engine components to cool.
- Position the motorcycle on level ground.
- 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

- Sump drain plug

Lubrication System

- 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.
- 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

- 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.**
- Once the oil level is up to the upper level mark on the inspection window, refit the filler cap and O-ring.
- 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.

- Check for oil leaks then stop the engine.
- Check the oil level and if necessary top-up.

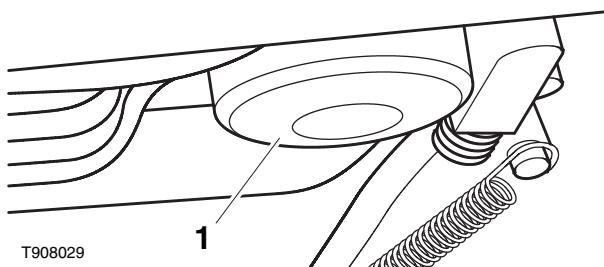
Oil & Filter Change



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.

- Drain the engine oil (see page 9-9).
- Position the container beneath the oil filter.
- Using tool T3880313, unscrew and remove the oil filter from the engine.



T908029

1. Oil filter

- Apply a smear of clean engine oil to the seal of the new filter and fill the filter with clean engine oil.
- Wipe clean the crankcase surface then fit the filter. Tighten the filter to **10 Nm** using tool T3880313.
- Refill the engine with clean oil of the correct specification (see page 9-10).

Low Oil Pressure Warning Light Switch

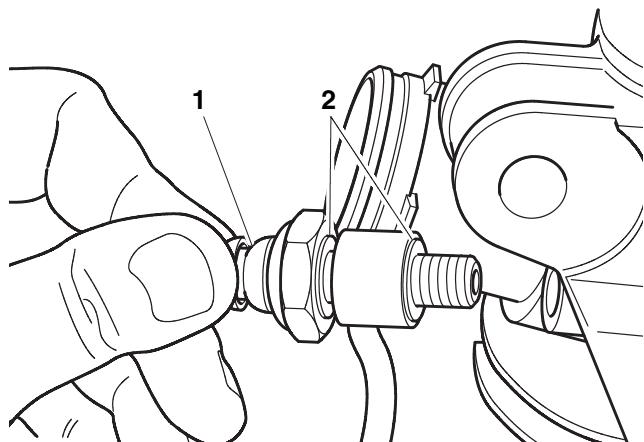
Removal



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. Disconnect the battery, negative (black) lead first.
2. Peel back the rubber boot to gain access to the switch terminal.
3. Slacken and remove the screw and disconnect the wiring terminal from the switch.
4. 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 (red) terminal first.
4. Check the engine oil level and top-up if necessary.
5. Start the engine and check for oil leaks.

Oil Cooler



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.

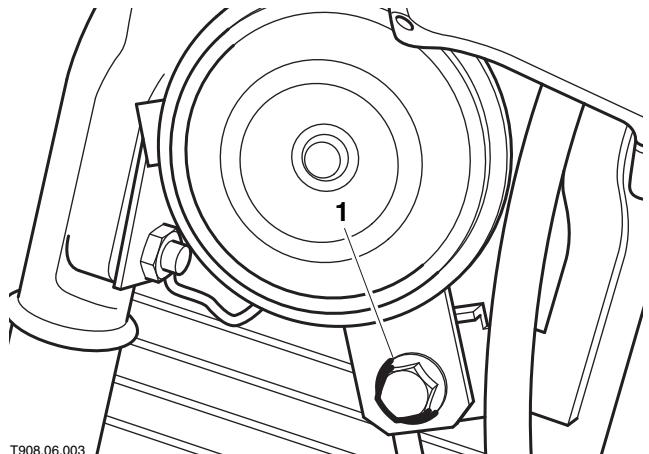
Removal



Warning

Before 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 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.

Lubrication System

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.

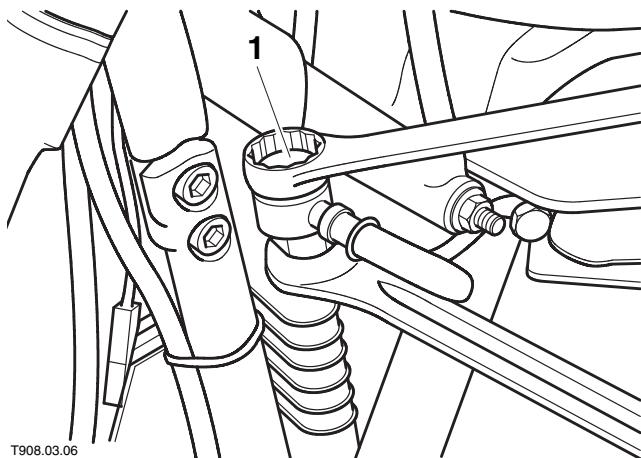
Note:

- **On EFI models, disconnect the oil temperature sensor connector before removing the upper banjo bolt.**



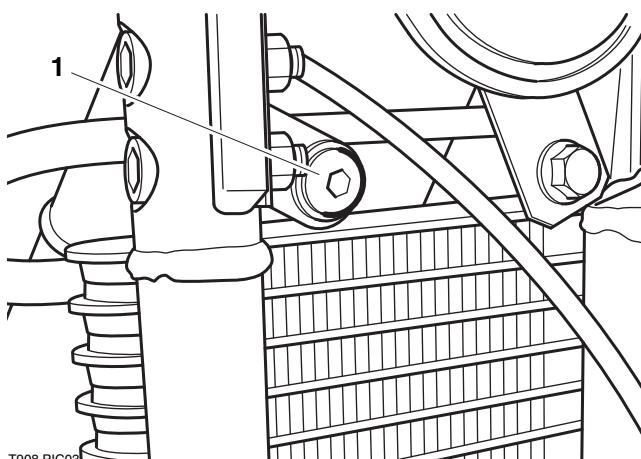
Caution

Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is slackened.



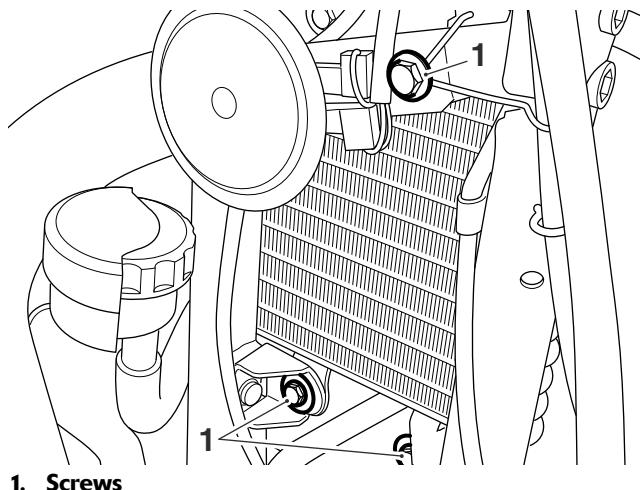
1. Banjo bolt

6. **Carburettor models only:** 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

7. **EFI models only:** Undo the three mounting screws and remove the oil cooler from the motorcycle. Take care not to lose the collars from the cooler's mounting rubbers.



Inspection

8. 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.
9. 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(s) and tighten to **8 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.

Note:

- **On EFI models, connect the oil temperature sensor connector after installing the upper banjo bolt.**
- 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 **24 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

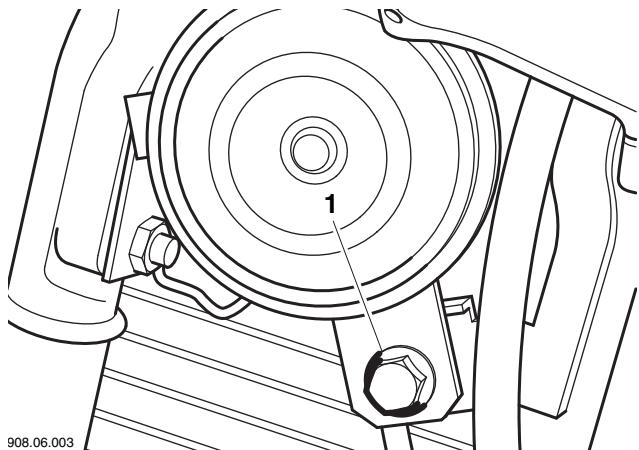
Removal



Warning

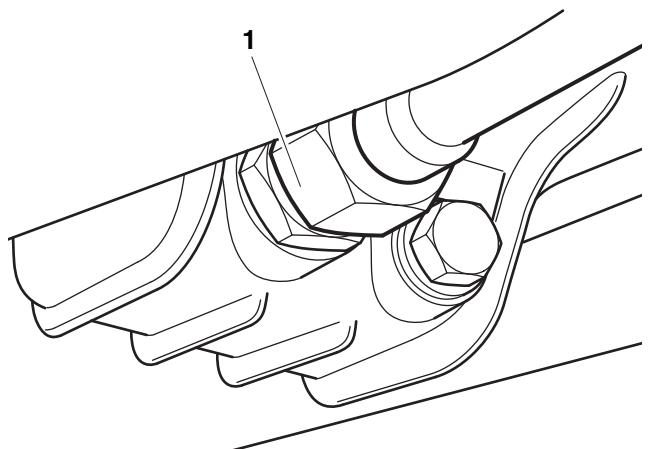
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Disconnect the battery, negative (black) lead first.
2. Drain the engine oil (see page 9-9).
3. Remove the oil filter (see page 9-10).
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

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

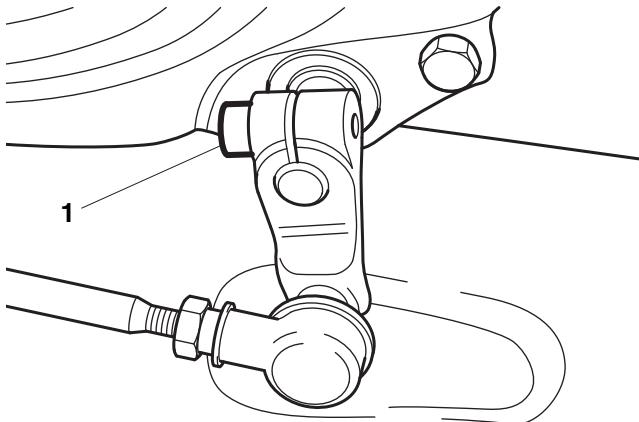
Lubrication System



Caution

Use an open-ended spanner to counterhold the oil cooler union with the sump as the union is slackened.

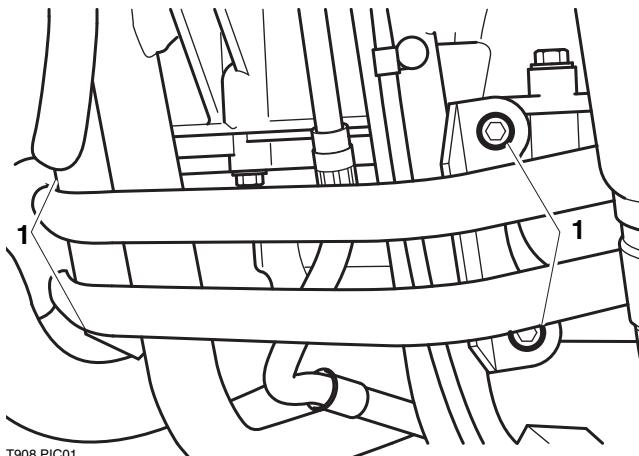
8. Release the clips securing the rear brake hose to the right hand frame cradle tube.
9. Note the position of the gear change lever on its shaft then unscrew the clamp bolt and remove the lever.



T908.03.06

1. Clamp bolt

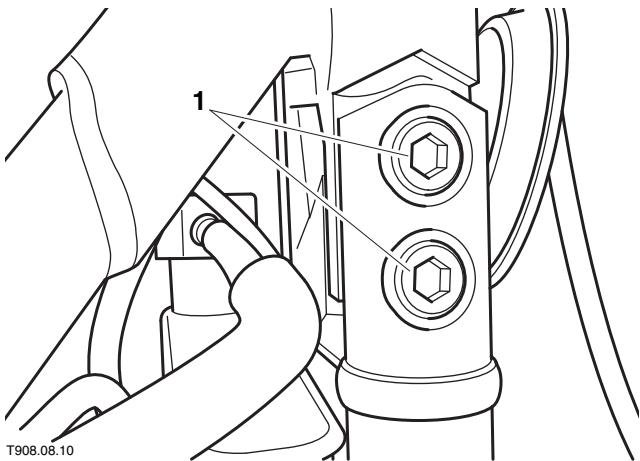
10. **America and America LT from VIN 611105 only (except VIN 611134):** Remove the Footboard assemblies (see page 16-31).
11. Release the foot control mounting bar from the frame. Taking care not to bend the rear brake hose, manoeuvre the bar assembly into a space above its mounting point such that it will allow the sump to be removed. Cable-tie the bar in place.



1. Mounting bar fixings

12. Release the starter motor cable from the right hand frame cradle tube, noting its correct routing.
13. Unscrew the nut and remove the front lower engine mounting bolt.

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



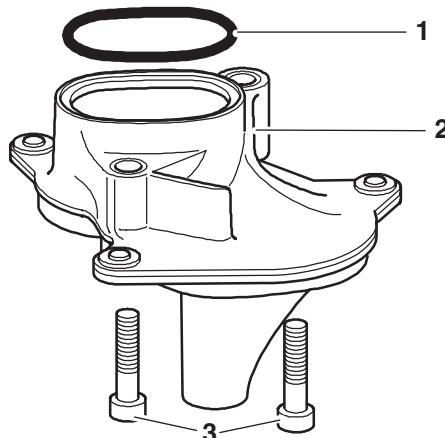
1. Cradle tube to frame bolts (right hand upper bolts shown)

15. Remove the bolts and manoeuvre the frame cradle tube assemblies away from the motorcycle.
16. Wipe clean the area around the oil cooler return pipe end fitting. Release the union and place the pipe to one side.
17. Evenly and progressively slacken and remove the retaining bolts then remove the sump.
18. Remove the sump gasket and discard it.
19. 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

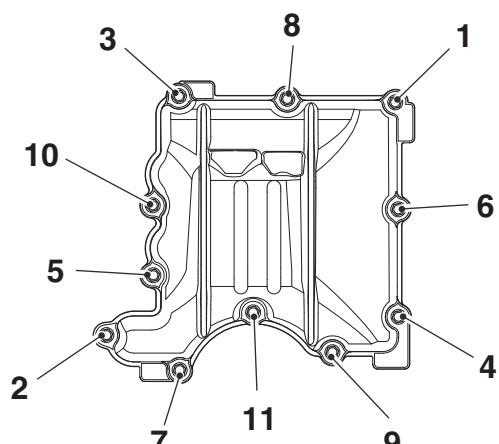
1. Ensure the sump and crankcase mating surfaces are clean and dry and the oil pick-up strainer is clean and unblocked.
2. Clean the threads of the oil pick-up screws and apply a drop of locking compound (Apply ThreeBond 1360 to threads is recommended) to each one.

- 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**

- Fit a new gasket then fit the sump to the crankcase.
- Install the retaining bolts. Tighten bolts 1 to 11 in the sequence shown below to **10 Nm**.
- Re-tighten bolts 1 and 2 to **10 Nm**.



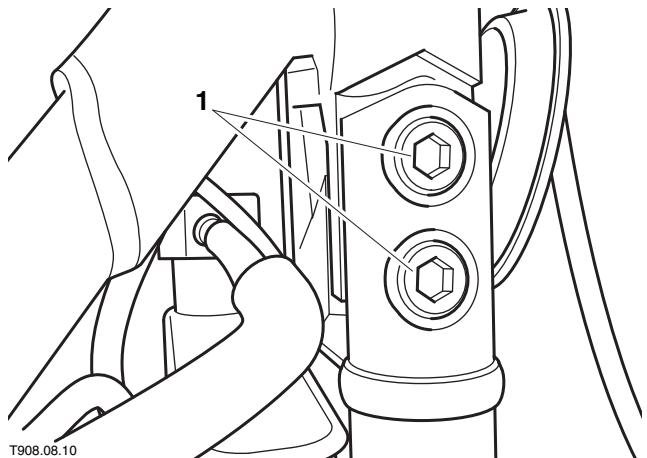
Sump Tightening Sequence

- 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.**

- Refit the frame cradle tubes 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.
- Insert the engine front lower mounting bolt from the left hand side and hand-tighten its nut.
- Tighten the frame cradle tube bolts to **55 Nm** if black bolts (T3050220) are fitted, and **40 Nm** if silver bolts (T3050224) are fitted.



- 1. Cradle tube to frame bolts (right hand upper bolts shown)**

- Tighten the engine front lower bolt to **80 Nm**.
- Ensure the starter motor cable is correctly routed and secure it to the frame cradle tube.
- Refit the oil cooler to the frame cradle tubes.
- Ensure the collars are fitted to the mounting rubbers then position the cooler to the mounting points. Tighten the fixing(s) to **8 Nm**.
- 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**.

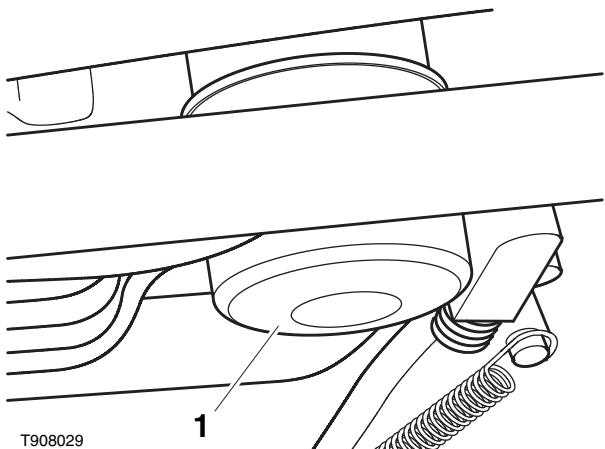
Caution

Use an open-ended spanner to counterhold the oil cooler union as each banjo bolt is tightened.

- Reconnect the wiring connectors to the horn then seat the horn on the frame and tighten its mounting bolt to **24 Nm**.
- Refit the foot control mounting bar, tightening the fixings to **27 Nm**.
- Refit the clips and secure the rear brake hose to the right hand frame cradle tube.
- America and America LT from VIN 611105 only (except VIN 611134):** Refit the footboard assemblies (see page 16-32).
- 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**.

Lubrication System

- 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

- Wipe clean the crankcase surface then fit the filter. Tighten the filter to **10 Nm** using tool T3880313.
- Refill the engine with clean oil of the correct specification (see page 9-10).
- Reconnect the battery positive (red) lead first.
- Start the engine and check for leaks.
- Stop the engine and adjust the engine oil level as described earlier in this section.

Oil Pressure Relief Valve

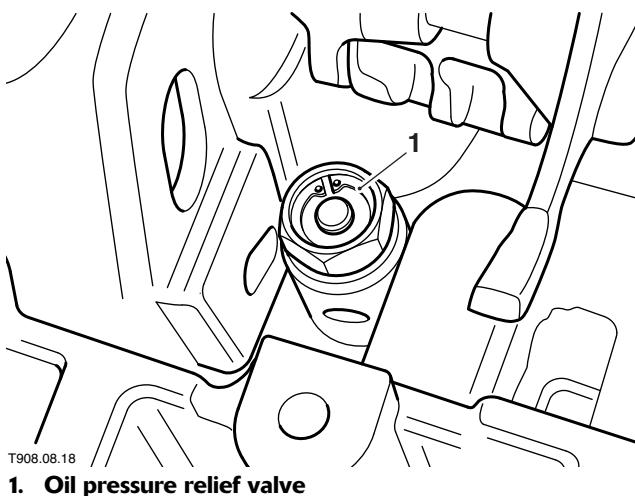
Removal



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.

- Disassemble the crankcase halves (see page 7-5).
- Unscrew the oil pressure relief valve from the lower crankcase half.



Inspection

- Check the valve plunger moves smoothly and returns freely to its stop under spring pressure. If not renew the pressure relief valve.

Installation

- Ensure the valve threads are clean and dry.
- Apply a drop of thread locking compound (ThreeBond 1305 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.

- Assemble the crankcase halves (see page 7-6).

Oil Pumps

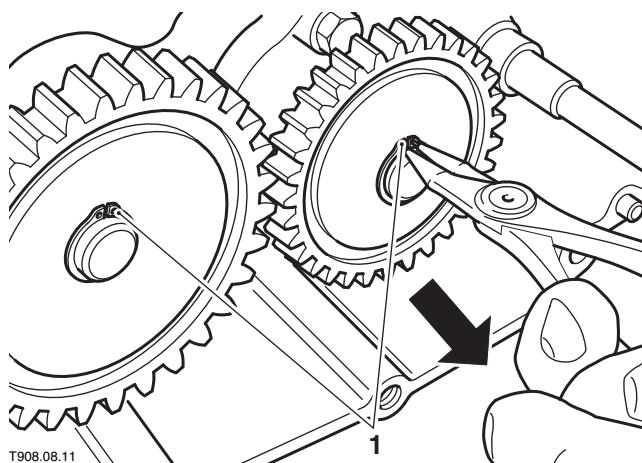
Removal



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.

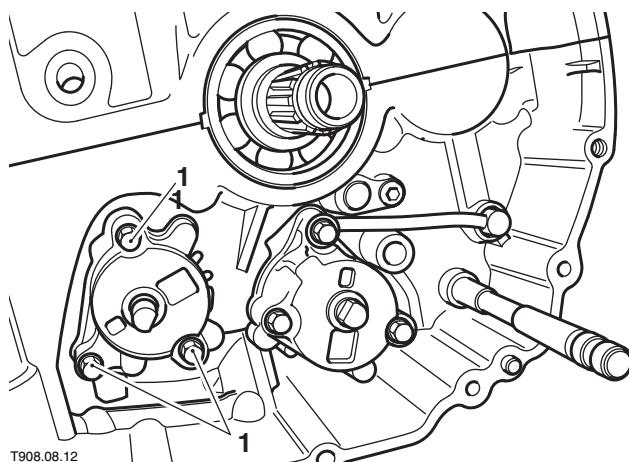
1. Drain the engine oil (see page 9-9).
2. Remove the clutch assembly (see page 5-9).
3. Remove the circlips and slide the driven gears off of the oil pump shafts.



1. Oil pump driven gear circlips

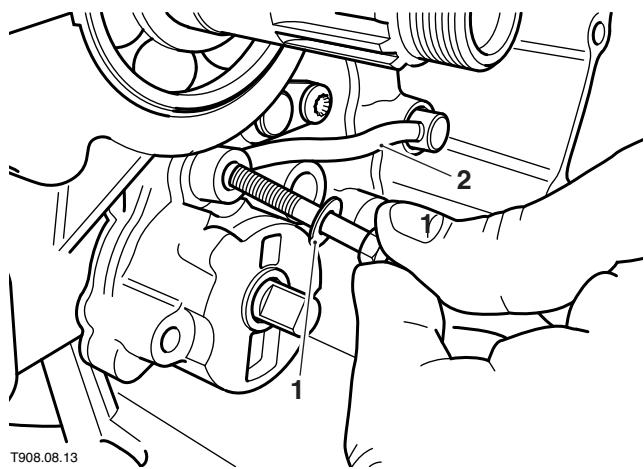
Note:

- From engine number 431209, some engines are fitted with a steel gasket under the front oil pump. The rear oil pump does not have a steel gasket fitted.
- 4. To remove the front pump, unscrew the bolts then remove the pump from the crankcase. If fitted, collect the steel gasket from behind the pump.



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).

Lubrication System

Inspection

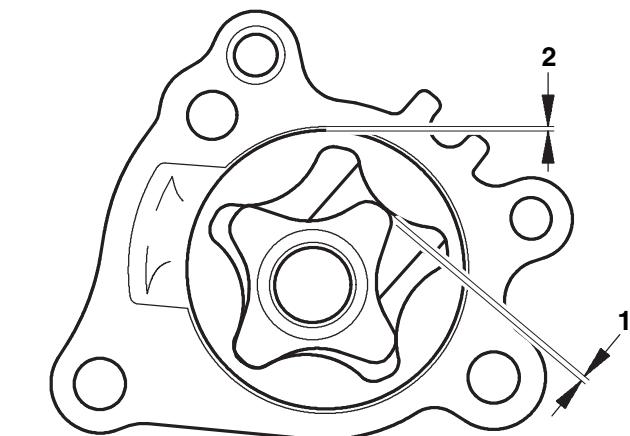


Caution

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.

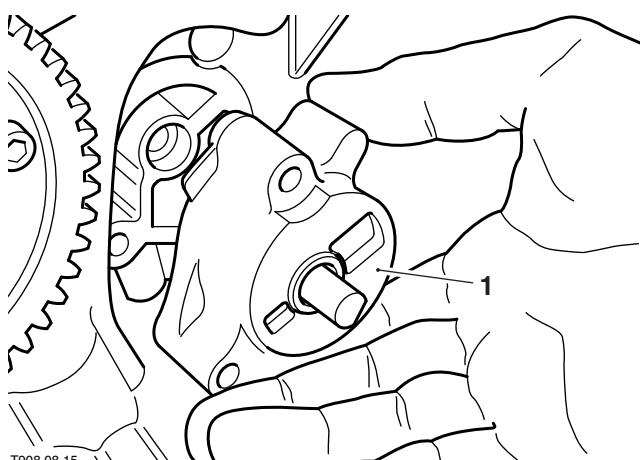


Caution

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.

Note:

- From engine number 431209, engines may be fitted with a steel gasket under the front oil pump. The rear oil pump does not have a steel gasket fitted.
- 2. Fit the front oil pump to the crankcase, installing the steel gasket if removed, and install its bolts. Evenly and progressively tighten the bolts to **12 Nm**.



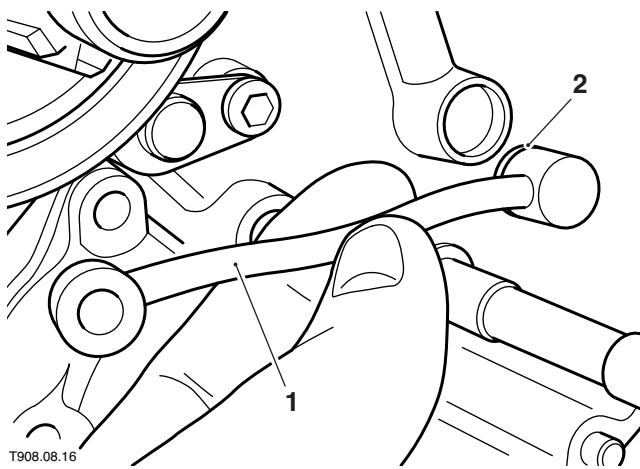
T908.08.15
1. Front oil pump



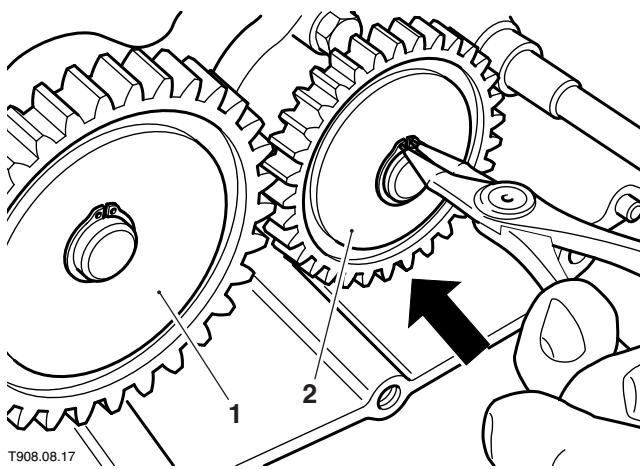
Warning

Only fit a steel gasket (fitted from engine number 431209), to the front oil pump, do not fit a steel gasket to the rear oil pump. Fitting a gasket to the rear pump may reduce oil flow to the engine, resulting in engine damage, loss of motorcycle control and an accident.

- 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**.



- 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.



- Install the clutch assembly (see page 5-12).
- Refill the engine with oil (see page 9-10).

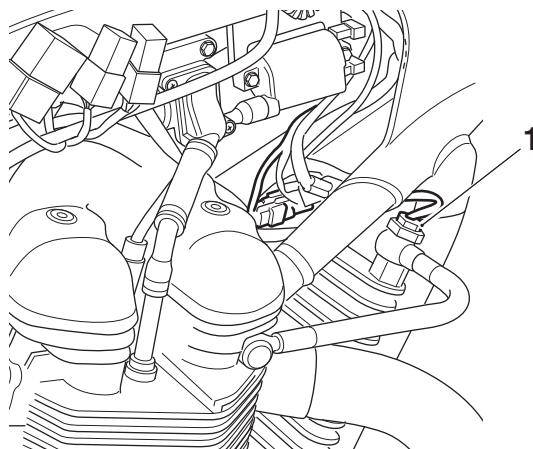
Oil Temperature Sensor - Fuel Injected models only

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.

- Disconnect the battery, negative (black) lead first.
- Disconnect the oil temperature sensor's multiplug from the main harness, located under the front of the fuel tank.
- Peel back the rubber boot covering the sensor.
- Unscrew the sensor from the upper union on the right hand side of the oil cooler and remove it. Recover the sealing washer from the oil temperature sensor and discard it.



Installation

- Apply a few drops of ThreeBond 1374 to the threads of the oil temperature sensor.
- Position a new sealing washer to the oil temperature sensor then screw in the sensor to the oil cooler union. Tighten the sensor to **18 Nm**.
- Reconnect the oil temperature sensor multiplug to the main harness connector under the fuel tank.
- Refit the rubber boot to the oil temperature sensor.
- Reconnect the battery, connecting the positive (red) terminal first.
- Check the engine oil level and top-up if necessary.
- Start the engine and check for oil leaks.

Lubrication System

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10A Fuel System - Carburettor Models

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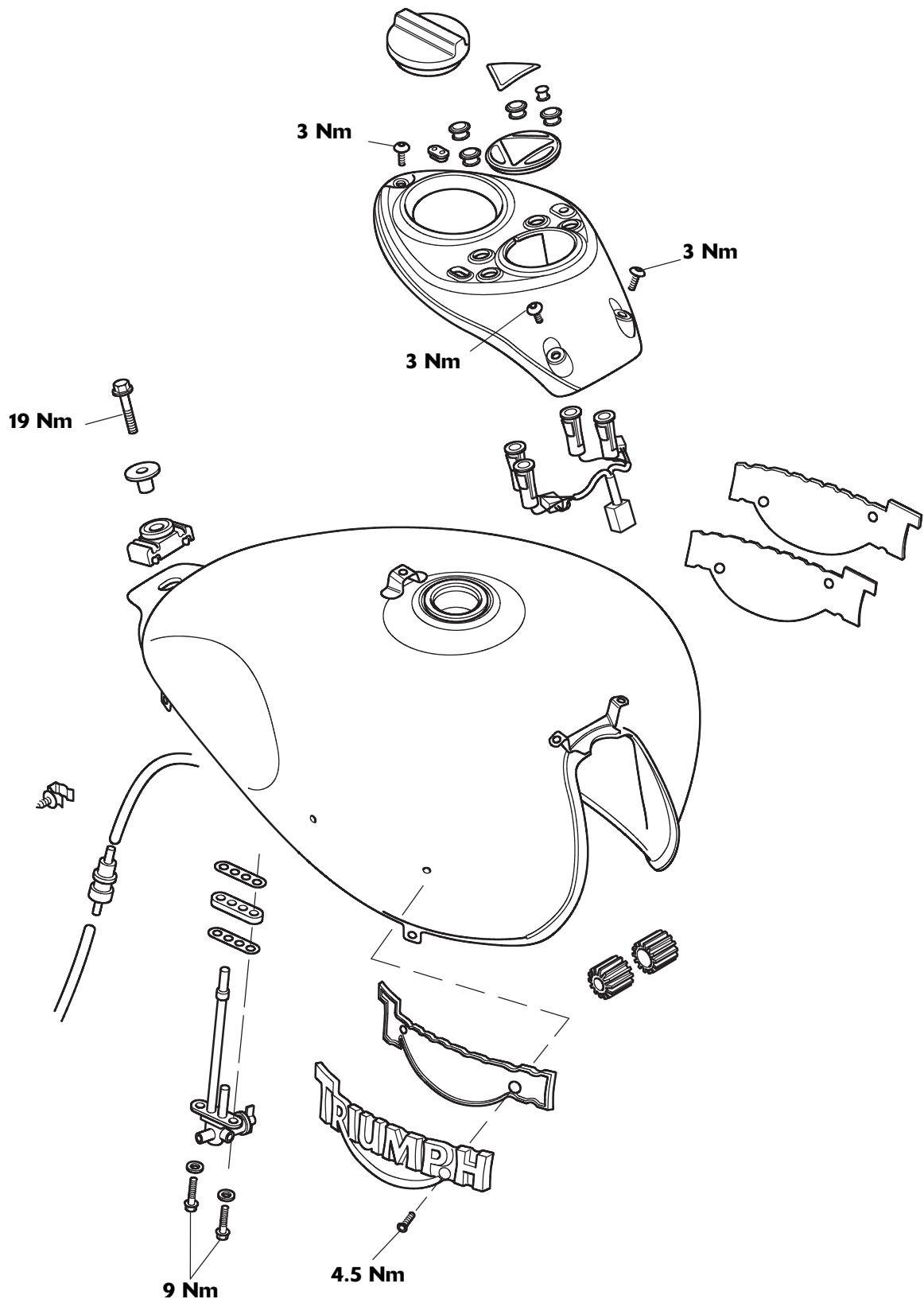
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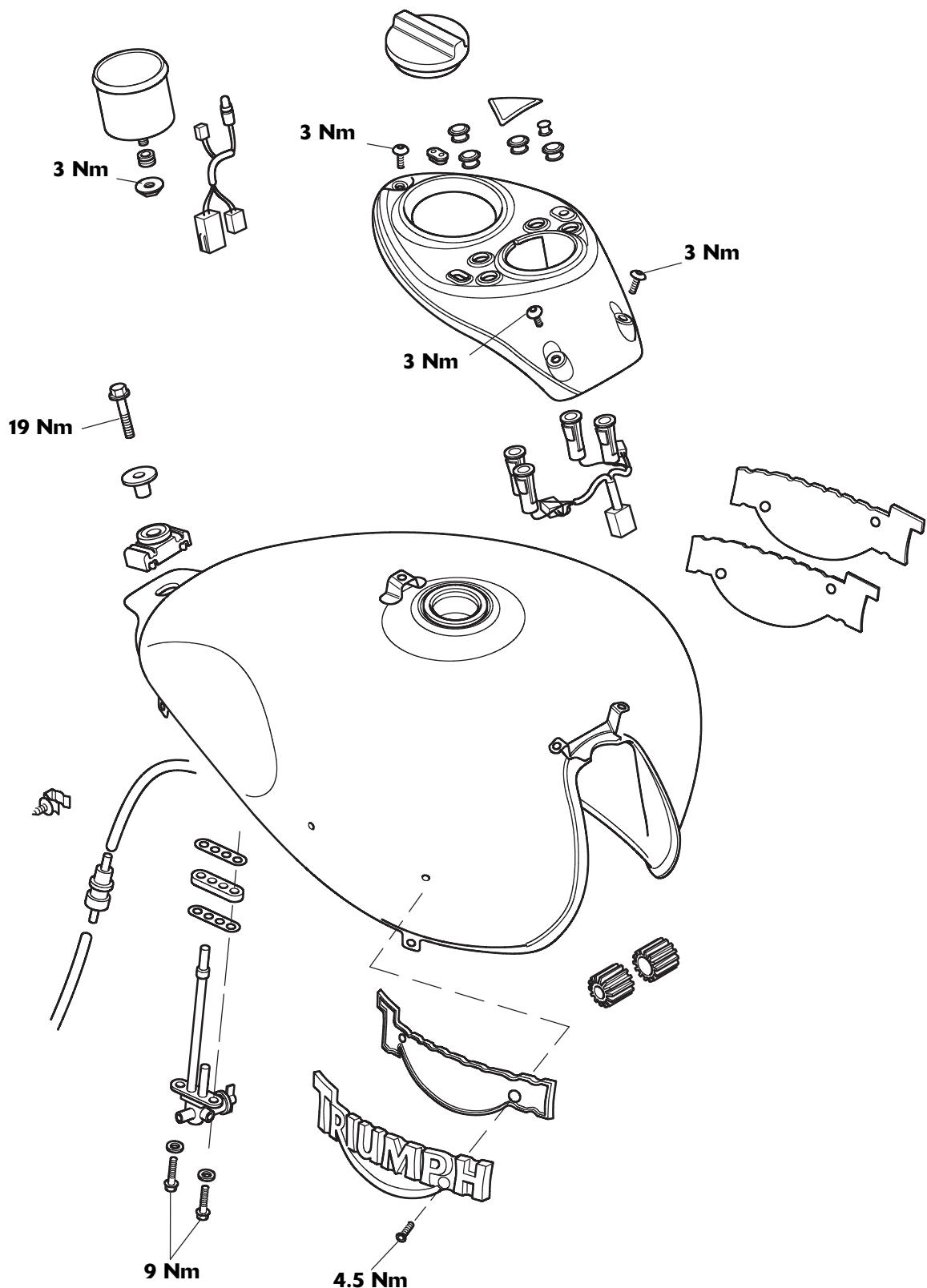
Fuel System - Carburettor Models

Exploded View - Fuel Tank and Fittings - America

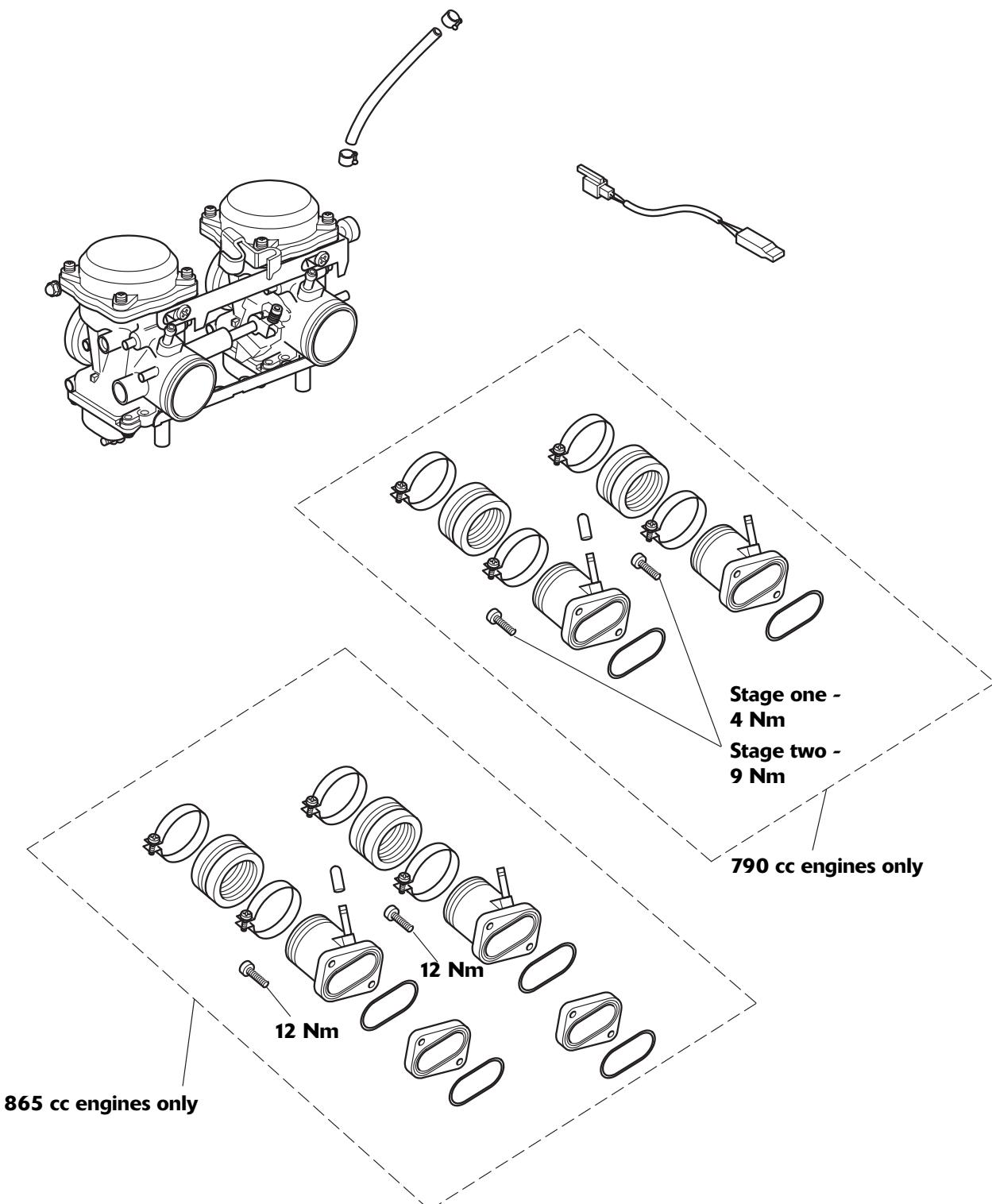


Fuel System - Carburettor Models

Exploded View - Fuel Tank and Fittings - Speedmaster

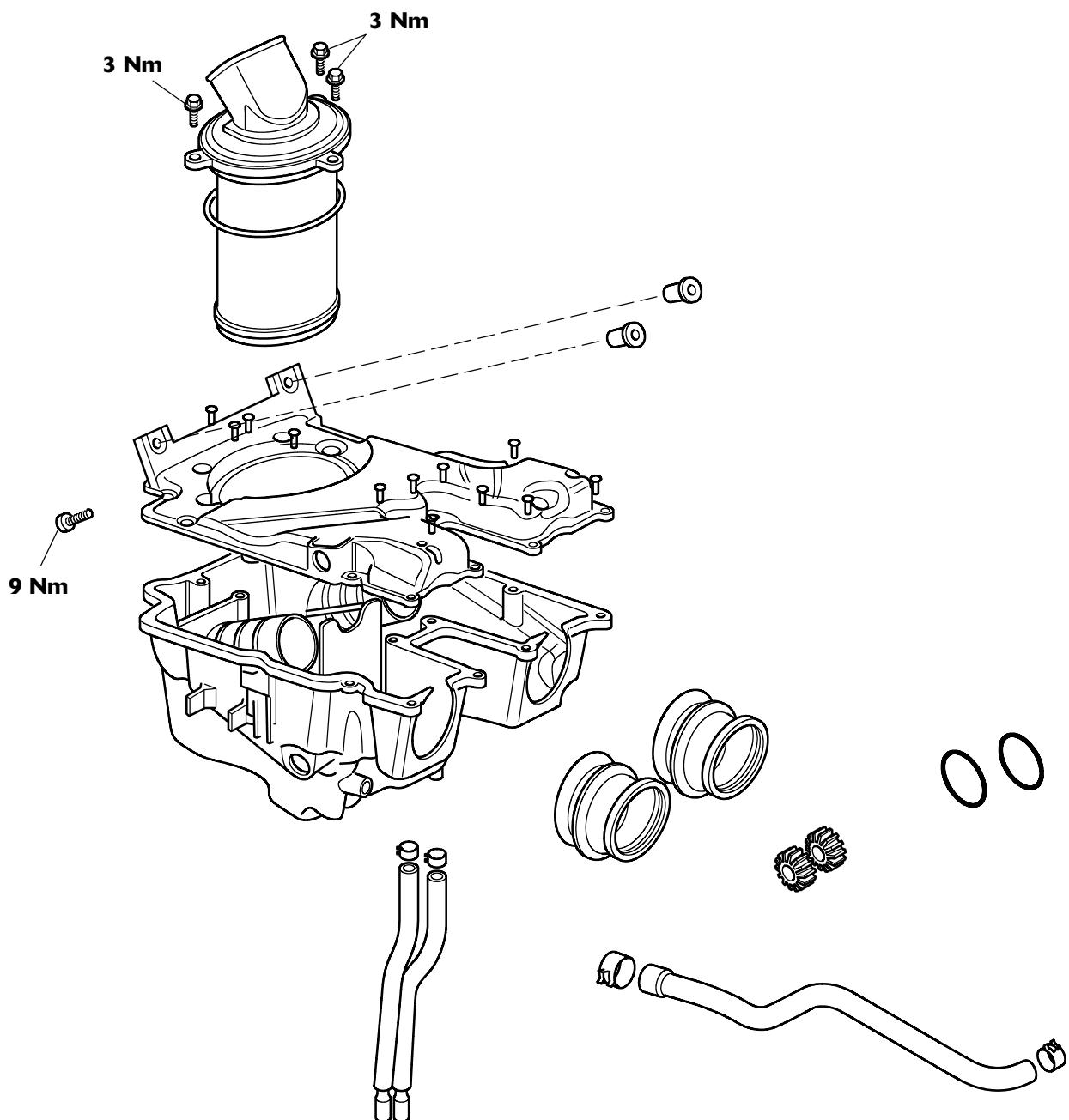


Exploded View - Carburetors and Fittings

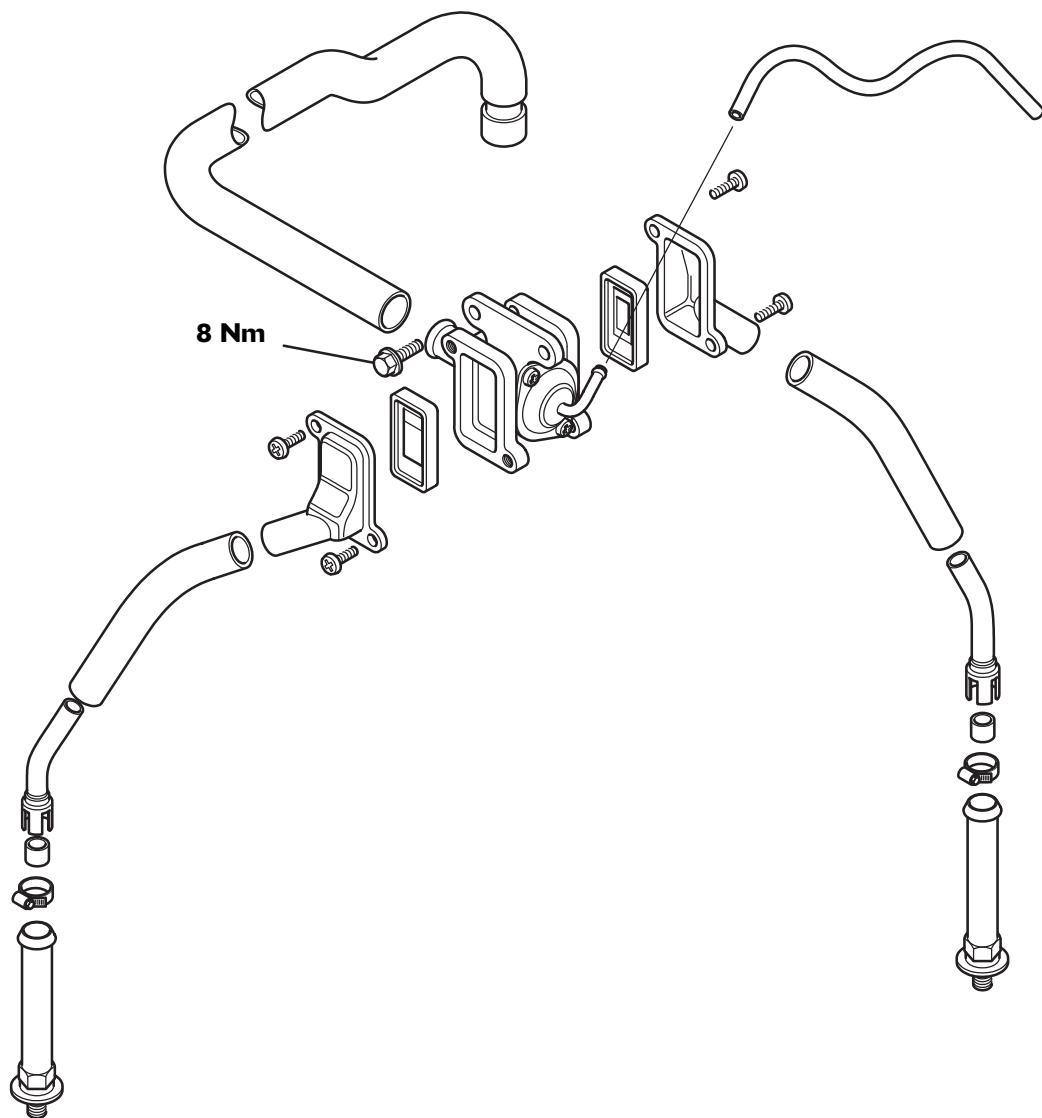


Fuel System - Carburettor Models

Exploded View - Airbox

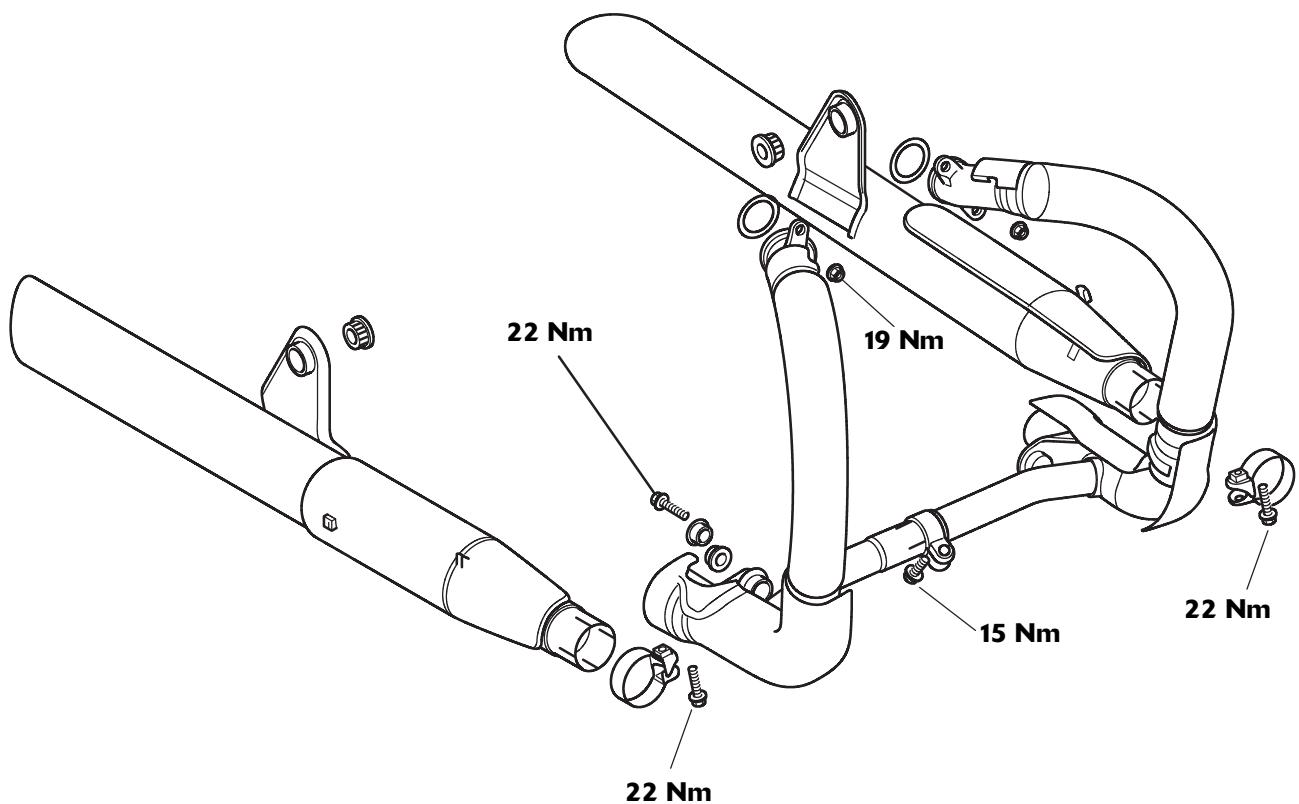


Exploded View - Secondary Air Injection System Components

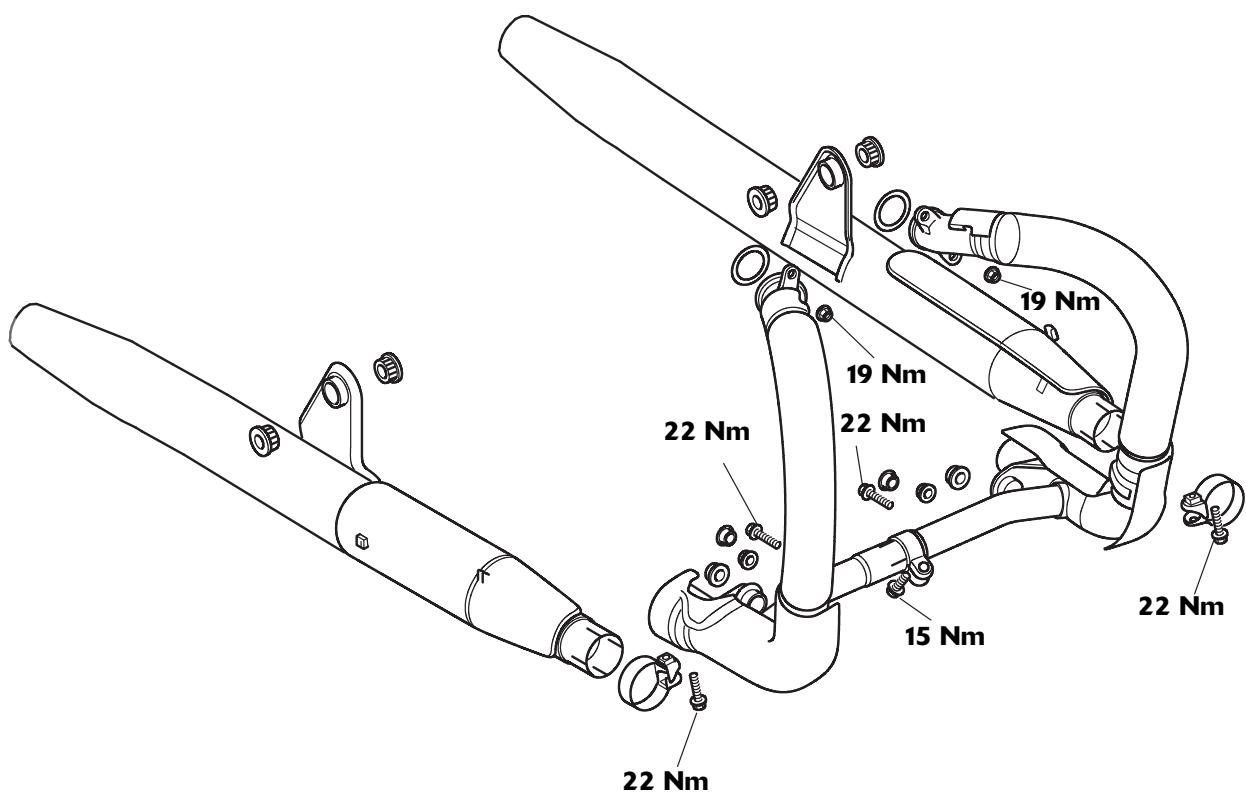


Fuel System - Carburettor Models

Exploded View - Exhaust System - 'Slash Cut Silencers'



Exploded View - Exhaust System - 'Cone Ended Silencers'



Fuel System - Carburettor Models

Fuel Requirements

All countries except USA

Outside America, all Triumph America and Speedmaster motorcycles fitted with carburettors 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



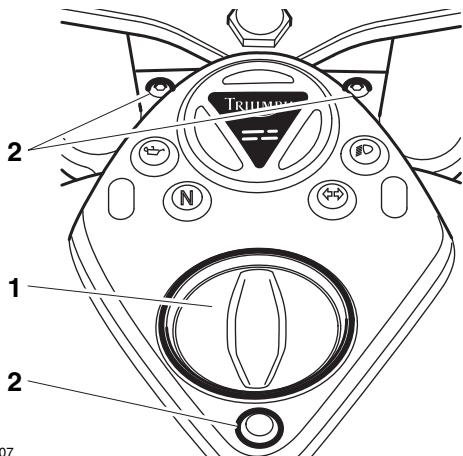
Warning

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 console and disconnect the warning light and tachometer (if fitted) sub-harness from the main wiring harness then place the warning light console to one side.



T908.PIC07

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.

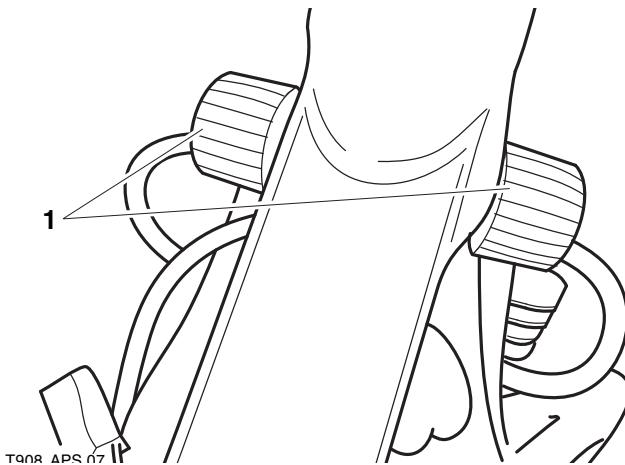
Note:

- 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.

Fuel System - Carburettor Models

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 **3 Nm**.
7. Reconnect the battery, positive (red) lead first.
8. Turn the fuel tap 'ON' and check for fuel leaks.

Fuel Tap Overhaul

Disassembly

1. Remove the fuel tank as described on page 10A-11.

! 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.

2. Drain the fuel tank into a suitable fuel proof container.

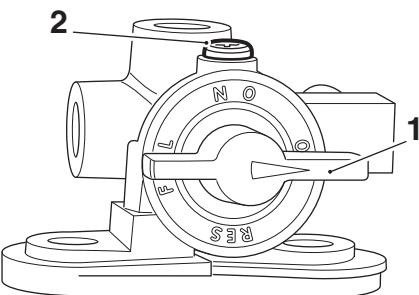
! Caution

Damage to painted surfaces could result from inadequate care during this process.

3. Invert the fuel tank and place on a protective surface to prevent paint damage.
4. Ensure the fuel tap is in the 'OFF' position.

Note:

- **The lever is under spring pressure and is held in position by the fixing.**
- 5. Lightly press in the fuel tap control and release the fixing.

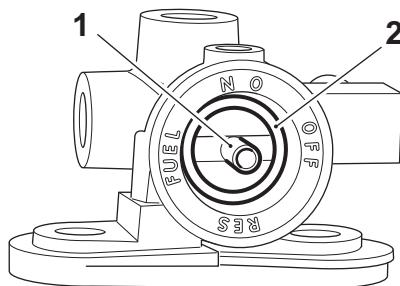


bq1

1. Fuel tap control
2. Fixing
6. Pull the fuel tap control out of the fuel tap.

Note:

- **Note the position of the spring to the fuel tap for assembly.**
- 7. Remove the spring and O-ring.

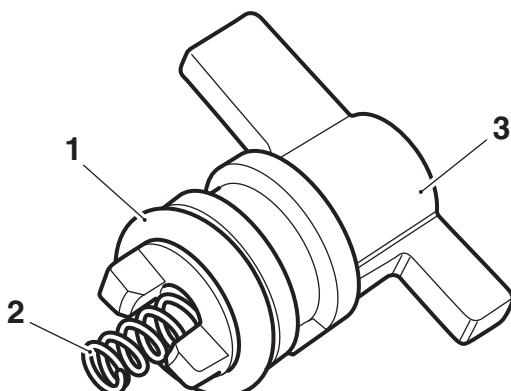


cfbs1

1. Spring
2. O-ring
8. Clean the fuel tap.

Assembly

1. Fit the new O-ring and spring to the new fuel tap control as shown below.



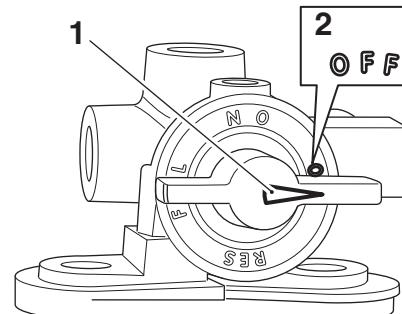
sfbt

1. O-ring
2. Spring
3. Fuel tap control

Note:

- **When fitting the fuel tap control, ensure the spring is correctly located to the fuel tap as noted on removal.**

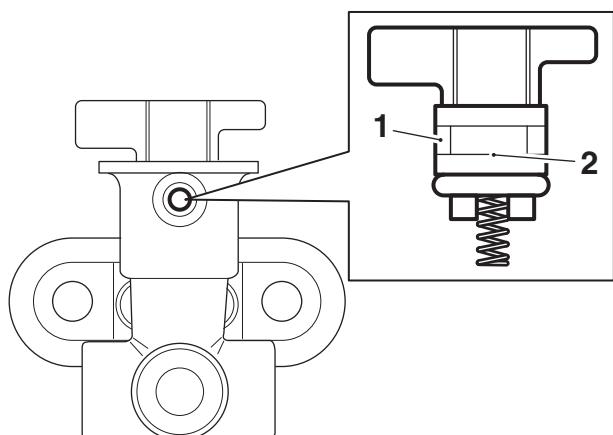
2. Fit the fuel tap control to the fuel tap with the arrow pointing to the 'OFF' position.



1

1. Arrow
2. 'OFF' position

3. Lightly press in the fuel tap control until the lower edge of the slot is below the hole for the fixing.



bu

1. Slot
2. Lower edge

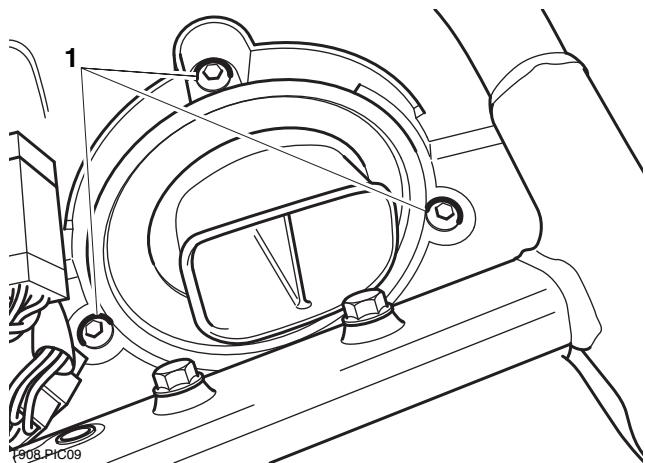
4. While lightly pressing the fuel tap control fit and tighten the fixing to **2 Nm**.
5. Refit the fuel tank as described on page 10A-12.
6. Refill the fuel tank with the fuel drained earlier.
7. Turn the fuel tap to the 'ON' position and check for leaks.

Fuel System - Carburettor Models

Air Filter Element

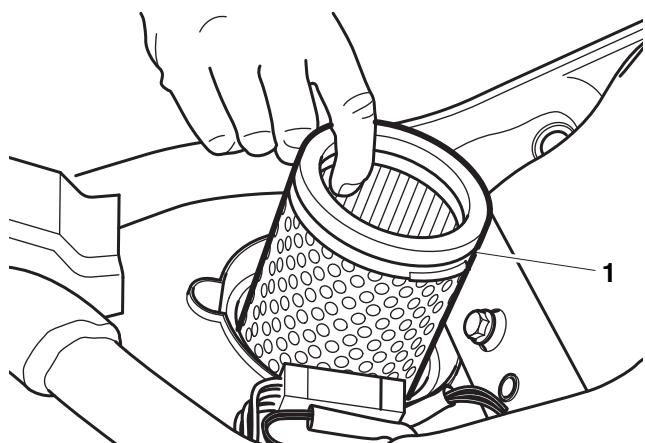
Removal

1. Remove the seats (see page 16-15 for America, see page 16-16 for Speedmaster).
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

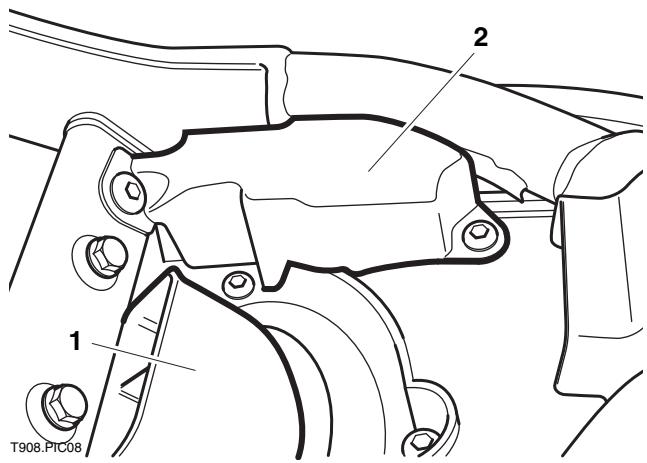
4. Remove the air filter element from the airbox.



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**.
3. Refit the cable cover. Tighten the fixings to **3 Nm** while ensuring the cables are tidily placed beneath the cover



1. Airbox

2. Cable cover

4. Refit the seats (see page 16-16).

Airbox

Removal

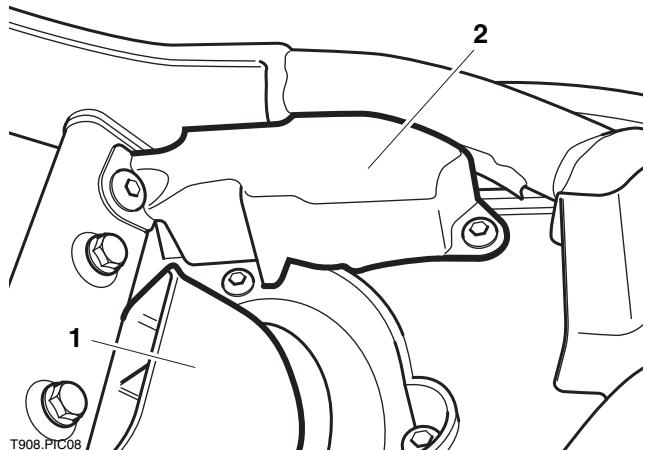
1. Raise the motorcycle and support the frame such that the rear wheel is clear of the ground.



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.

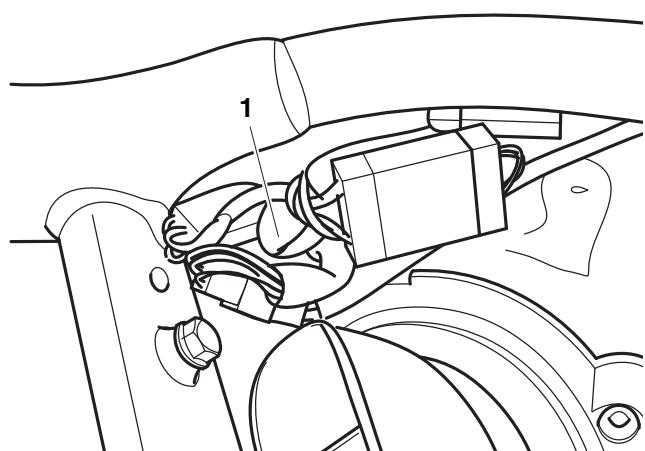
2. Disconnect the battery negative (black) lead first then remove the battery.
3. Remove the seat(s) (see page 16-15 for America, see page 16-16 for Speedmaster).
4. Remove the cable cover from the top of the airbox.



1. Airbox

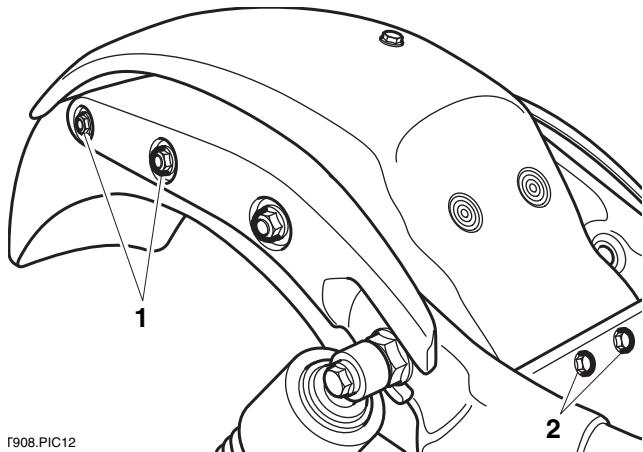
2. Cable cover

5. Disconnect the rear light wiring connector.



1. Rear light connector location

6. Remove the rear wheel (see page 15-22).
7. Release the rear mudguard fixings shown in the diagram below then carefully remove the mudguard from the motorcycle.

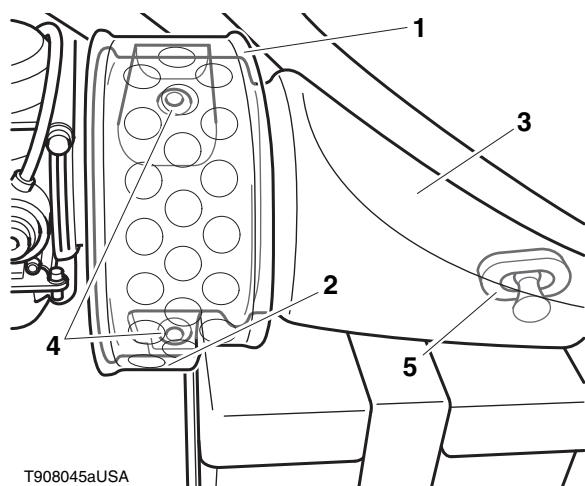


1. Rear mudguard side fixings

2. Rear mudguard front fixings

8. Remove the following:

- airbox covers
- fuse/ignition switch cover
- battery box
- right hand side cover.



1. Airbox finisher

2. Airbox finisher fixing location

3. Airbox cover

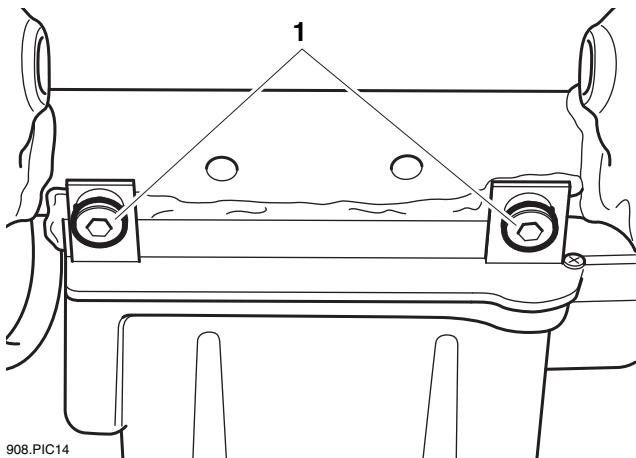
4. Airbox cover fixing locations

5. Stud location

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.

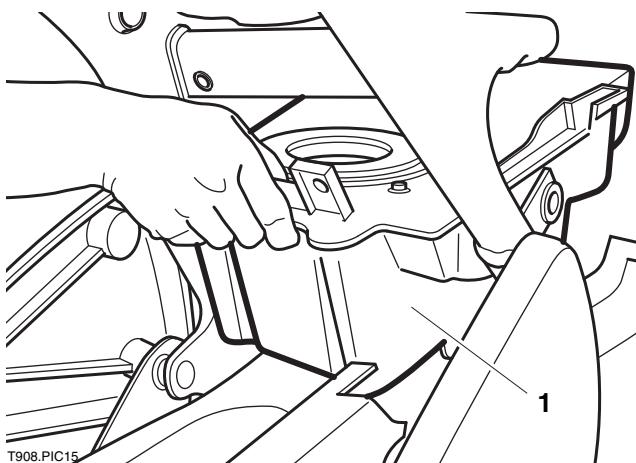
Fuel System - Carburettor Models

- Release the fixings securing the airbox to the frame.



1. Airbox fixings

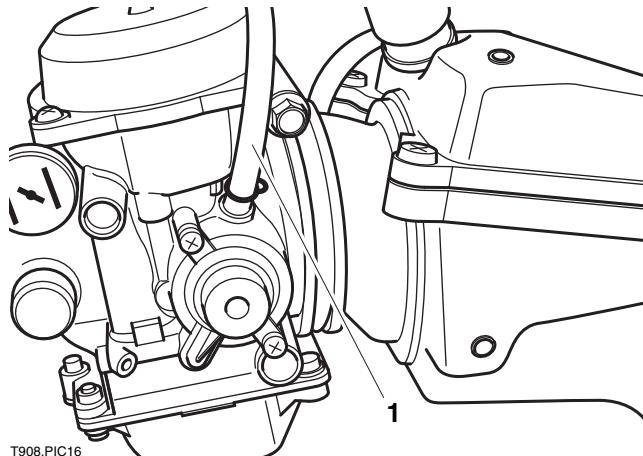
- Release the clips securing the airbox to the carburettors.
- Remove the airbox in a rearward direction adjusting its position to enable it to clear any obstacles.



1. Airbox

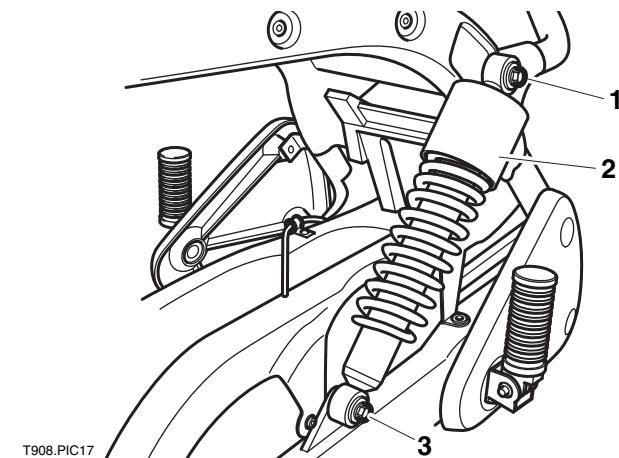
Installation

- 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

- Insert the airbox fixings, tightening to **9 Nm**.
- Tighten the clips securing the airbox to the carburettors.
- Refit and correctly route all the airbox hoses as noted during strip-down.
- Apply ThreeBond 1305 or equivalent to the threads of the rear suspension unit fixings.
- Support the swinging arm then refit both rear suspension units. Tighten the new upper and lower fixings to **28 Nm**.

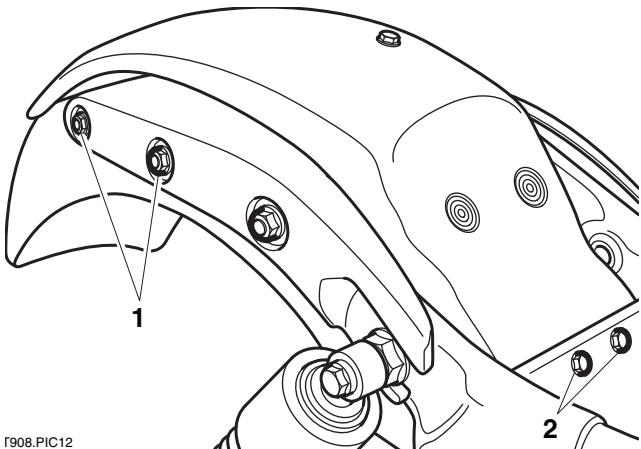


1. Upper mounting bolts

2. Rear suspension unit

3. Lower mounting bolts

7. Carefully refit the mudguard from the motorcycle.
Tighten the side fixings to **25 Nm**.
Tighten the front fixings to **30 Nm**.



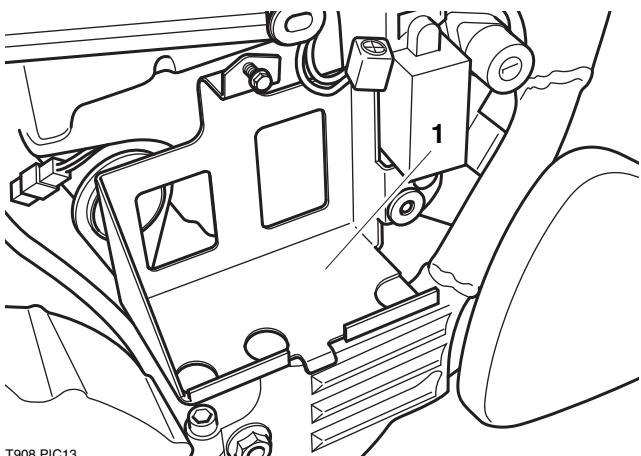
T908.PIC12

1. Rear mudguard side fixings

2. Rear mudguard front fixings

8. Refit the following:

- right hand side cover
- battery box
- fuse/ignition switch cover
- airbox covers.

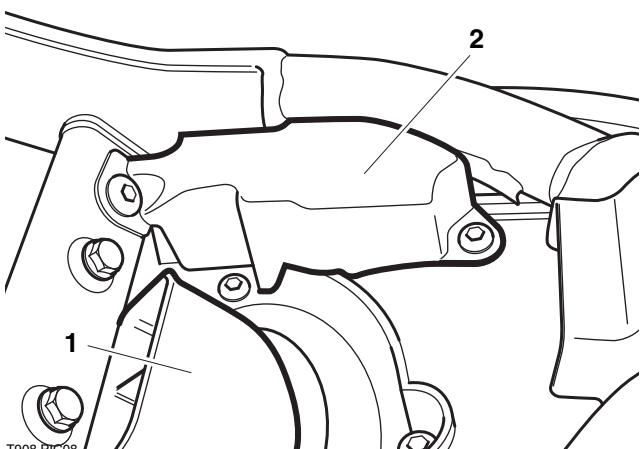


T908.PIC13

1. Battery box

9. Refit the rear wheel (see page 15-23).
10. Reconnect the rear light.

11. Refit the airbox cable cover and tighten the fixings while ensuring the cables are tidily placed beneath the cover.



1. Airbox

2. Cable cover

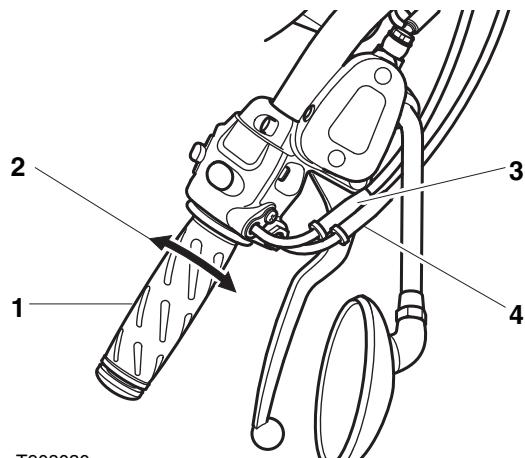
12. Install and reconnect the battery positive (red) lead first.
13. Refit the seat(s) (see page 16-16).
14. Switch on the ignition and test the rear light, rear indicators, number plate and brake lights for correct function. Rectify if necessary.
15. Lower the motorcycle to the ground and park on the side stand.

Fuel System - Carburettor Models

Throttle Cables

Inspection

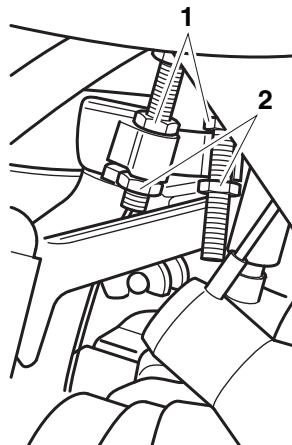
1. Throttle cable adjustment is checked by measuring the amount of free play at the twist grip. Adjustment is correct when 2 - 3 mm of free play movement is present.



- T90R030
1. **Twist grip**
 2. **Free play**
 3. **Opening cable adjuster**
 4. **Closing cable adjuster**

Adjustment

1. To adjust the cables, slacken the lock nuts 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 twist grip then securely tighten the lock nut.
3. If there is insufficient adjustment available, back-off the upper adjuster and adjust the free play at the carburetor end of the cable. Slacken the cable lock nuts and position them so all but a small amount of free play is removed from the cable. Securely tighten the lock nuts then carry out final adjustment with the upper adjuster.



1. **Lower adjusters**
2. **Lock nuts**
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.

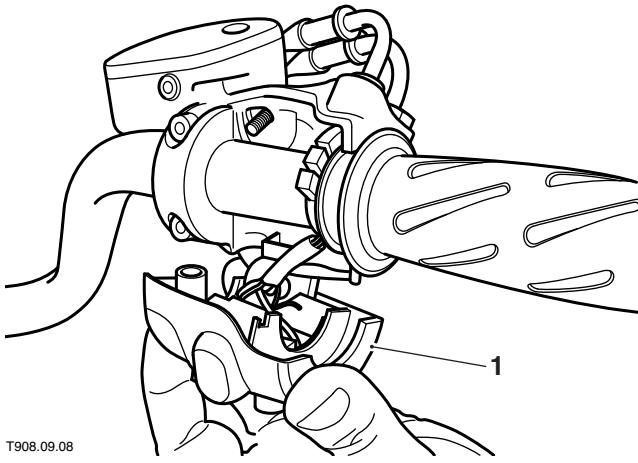


Warning

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.

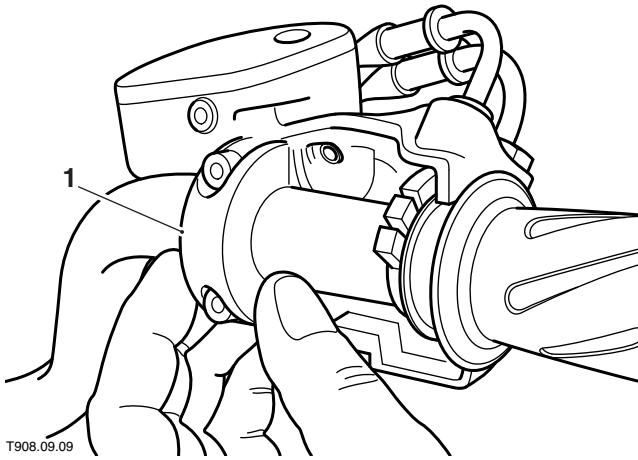
Removal

1. Remove the fuel tank (see page 10A-11).
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.



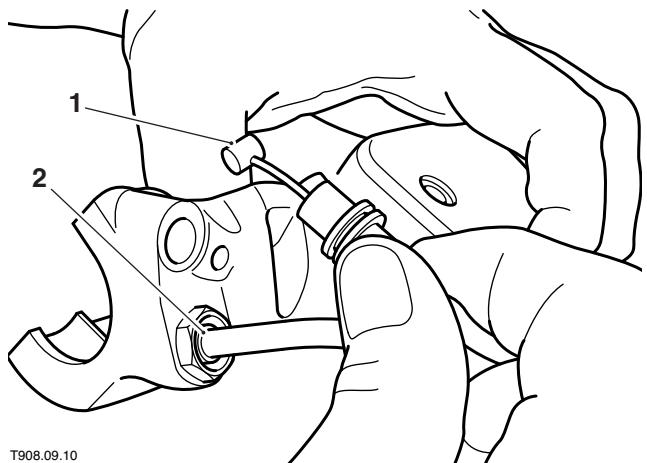
1. Master cylinder mounting clamp

5. Free the master cylinder from the handlebars and detach the cables from the twist grip.

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 twist grip.

6. Unscrew the nut and screw and free the throttle cables from the master cylinder.



T908.09.10

- 1. Opening cable**
- 2. Closing cable**

7. Slacken the lock nuts then detach each cable from the carburettor throttle linkage.

Note:

- **Free the carburetors 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

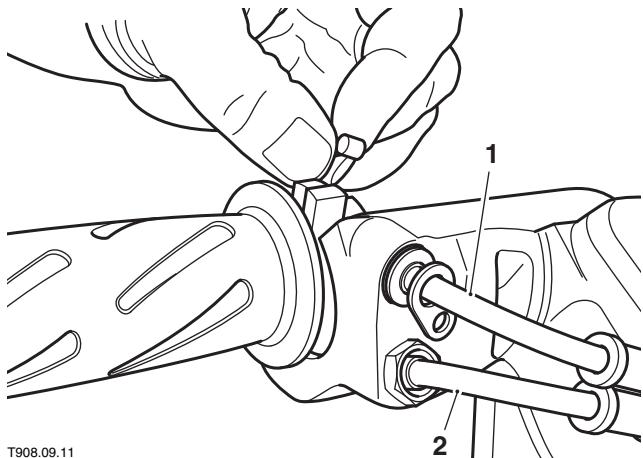
1. Check each inner cable for free movement through the outer cable.
2. Examine each inner cable for damage, fraying etc.
3. Examine the inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

Fuel System - Carburettor Models

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.
- Fit the cables to the motorcycle. Ensure each cable is correctly routed and retained by all the necessary clips as noted during removal.
 - Connect both inner cables to the carburettor throttle linkage and seat the outer cables in the mounting bracket.
 - Locate the outer cables in the master cylinder and attach them to the twist grip.



T908.09.11

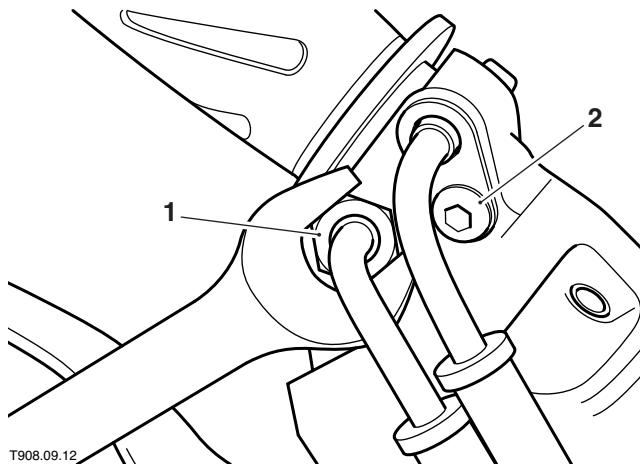
1. Closing cable
2. Opening cable

- Locate the master cylinder on the handlebars and fit the mounting clamp. Align the clamp lower split with the punch mark on the handlebar and tighten the upper clamp bolt to **12 Nm** then tighten the lower clamp bolt to **12 Nm**.
- Refit the switchgear assembly, tightening its screws to **2.5 Nm**.

Note:

- Prior to assembly, tuck the wiring connector for the indicator into the recess in the front half of the switchgear.

- Securely tighten the nut and screw securing the throttle cables to the master cylinder.



1. Closing cable nut
2. Opening cable screw

- Position the lower adjuster lock nuts so only a small amount of free play is present in each cable then tighten them securely.
- Operate the twist grip 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.

- Install the fuel tank (see page 10A-12).

Carburetors



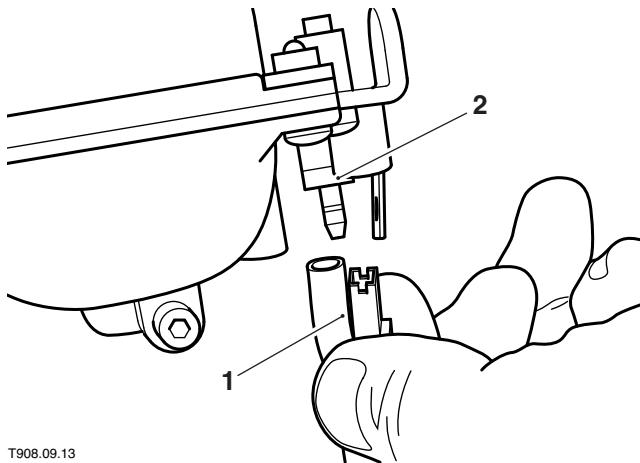
Warning

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 (see page 10A-11).
2. Disconnect the wiring connectors from the carburettor heaters and the throttle position sensor.

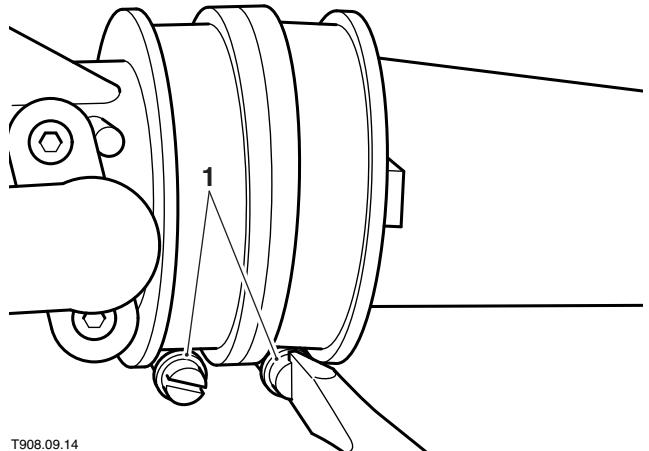


T908.09.13

1. Wiring connectors
2. Carburettor heater

3. On California models, disconnect the evaporative loss system pipes from the carburetors, noting the fitted location of each. Plug the hose ends.
4. Release the retaining springs securing the airbox rubbers to the carburetors.

5. Slacken the retaining clips securing the intake rubbers to the carburetors and cylinder head adaptors.



T908.09.14

1. Retaining clip screws

6. Free the carburetors from the intake rubbers and manoeuvre them out of position.

Note:

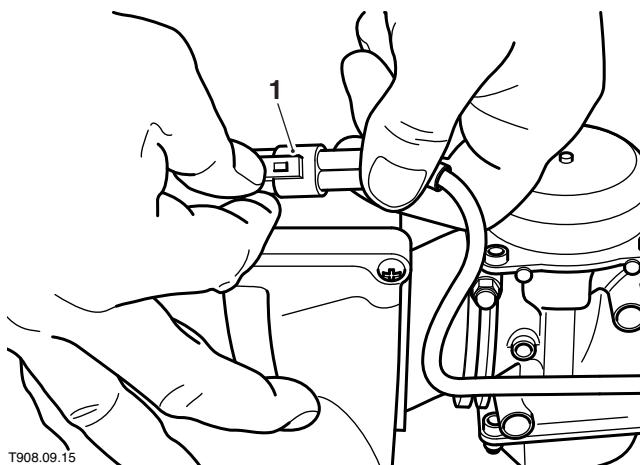
- Lubricate the intake rubbers with a silicone-based spray lubricant to ease removal.
- 7. Slacken the throttle cable lock nuts then detach both cables from the throttle linkage and remove the carburetors.

Installation

1. Reconnect the throttle cables to the carburetors, ensuring they are connected the right way around. Adjust the cable free play then securely tighten the lock nuts.
2. Ensure the clips are all in position then lubricate the intake and airbox rubbers with a silicone-based spray lubricant.
3. Manoeuvre the carburetors into position and engage them correctly with the intake and airbox rubbers.
4. Ensure the carburetors are correctly seated in the intake rubbers then securely tighten the retaining clips.
5. Ensure the airbox rubbers are correctly seated on the carburetors then secure them in position with the spring clips.
6. On California models correctly reconnect the evaporative loss system hoses.

Fuel System - Carburettor Models

7. Reconnect the wiring connectors to the carburettor heaters and throttle position sensor.



T908.09.15
1. Throttle position sensor wiring connector

8. Operate the twist grip 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 (see page 10A-12).

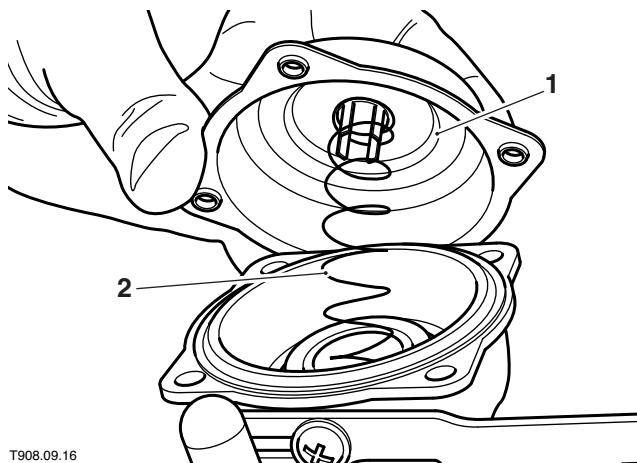
Carburettor Overhaul

Disassembly

Note:

- The carburettors can be overhauled without being separated.
- Overhaul each carburettor individually to avoid interchanging parts.

- Remove the carburettors (see page 10A-21). Each carburettor can then be overhauled as follows.
- Undo the screws and remove the vacuum chamber cover and spring.

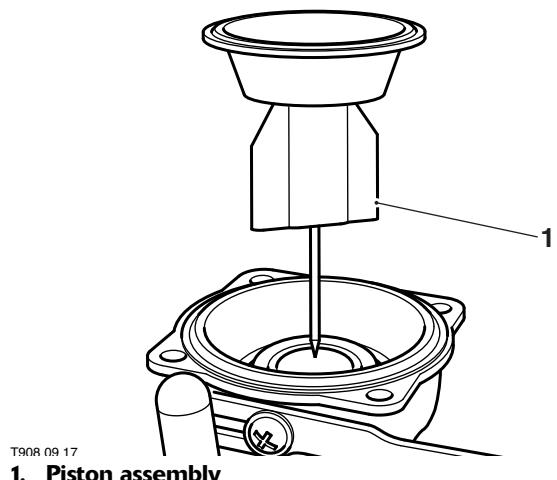


T908.09.16

1. Vacuum chamber cover

2. Spring

- Free the diaphragm from the top of the carburettor and withdraw the piston assembly.

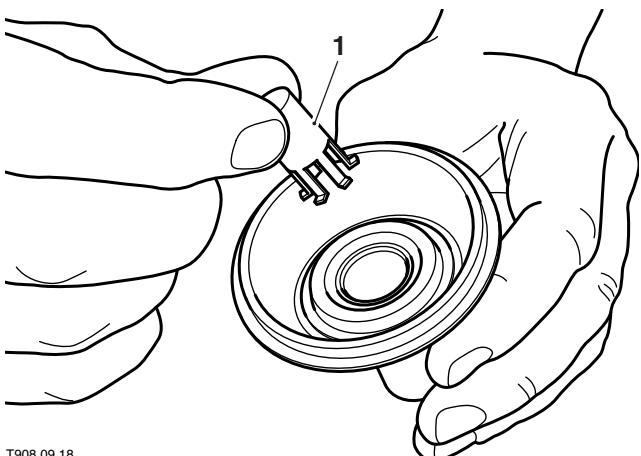


T908.09.17

1. Piston assembly

Fuel System - Carburettor Models

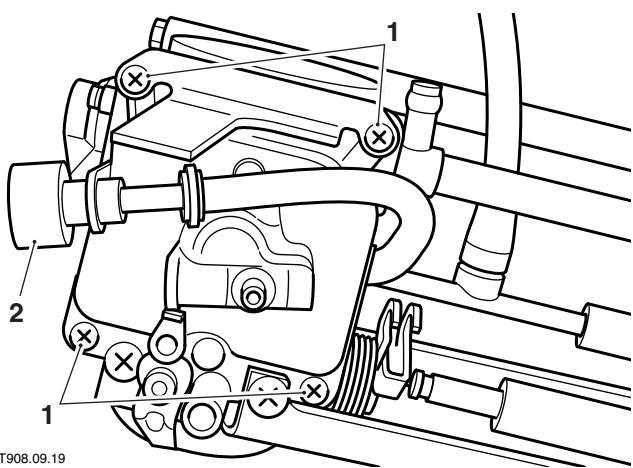
- Remove the retainer from the piston and tip out the needle.



T908.09.18

1. Needle retainer

- 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).



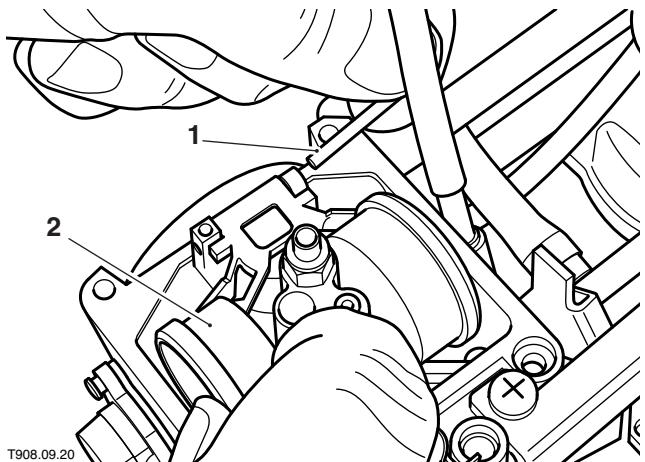
T908.09.19

**1. Float chamber screws
2. Idle speed adjuster**

- Remove the pivot pin and lift out the float and needle valve.

Note:

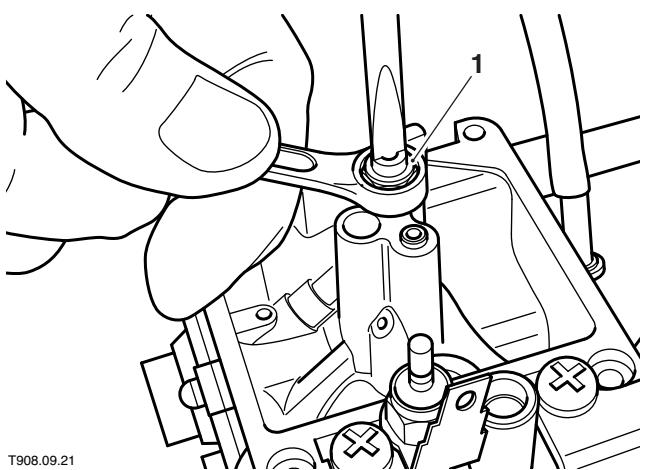
- The needle valve seat is bonded in position.**



T908.09.20

**1. Pivot pin
2. Float**

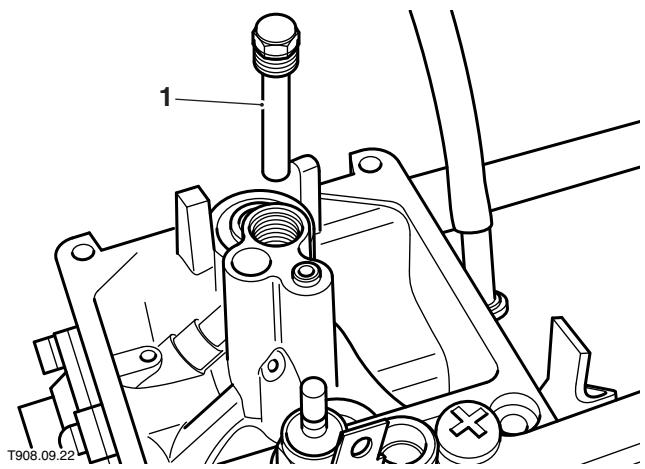
- Unscrew the main jet from the needle jet holder.



T908.09.21

1. Main jet/holder

- Unscrew the needle jet holder and tip out the needle jet, noting which way around it is fitted.

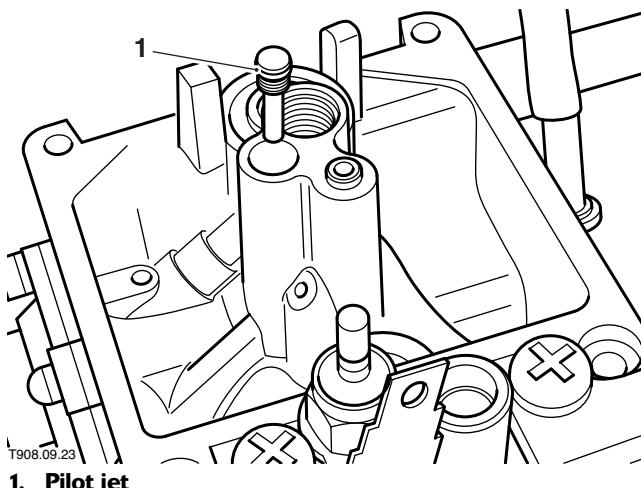


T908.09.22

1. Needle jet holder

Fuel System - Carburettor Models

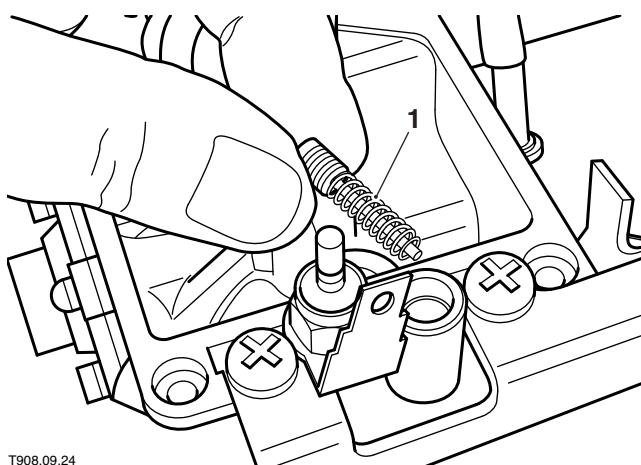
9. Using a small flat-bladed screwdriver, unscrew the pilot jet from the carburettor.



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:

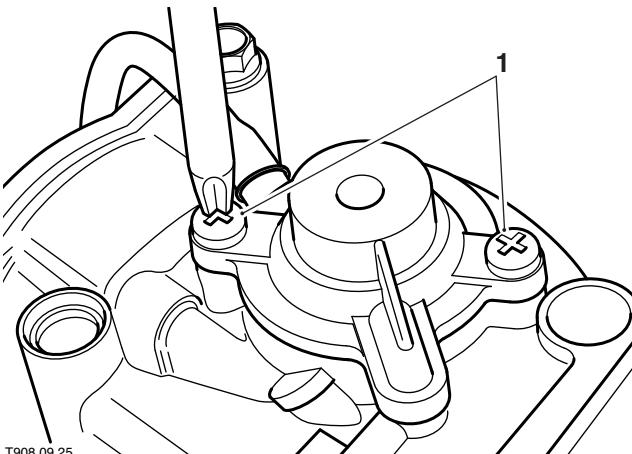
- On US and Canada models the screw is located behind an anti-tamper plug which will have to be removed to gain access to the screw.



1. Pilot screw assembly

11. Undo the screws and washers securing the choke linkage rod to the carburetors. Remove the choke linkage rod and its return spring. Recover the washer fitted between the rod and each carburetor.
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

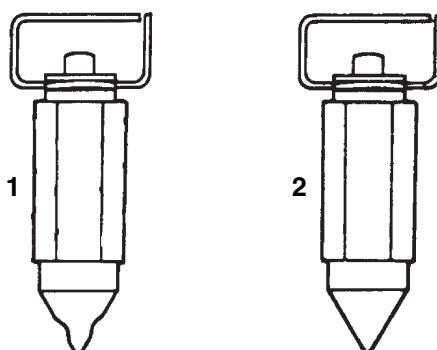
Inspection

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.



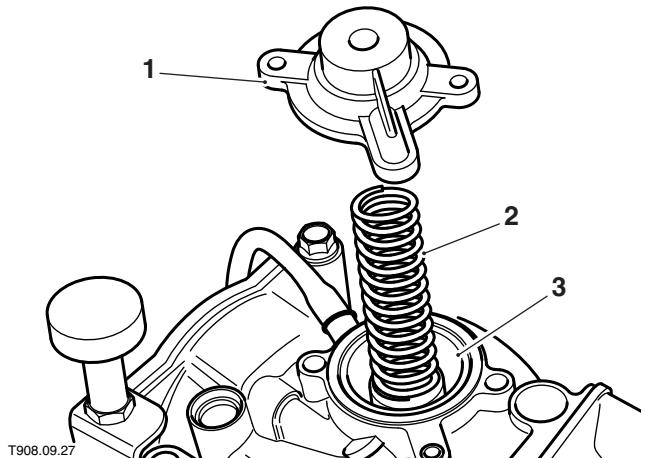
- 1. Worn needle valve tip**
2. Serviceable needle valve tip

Fuel System - Carburettor Models

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.

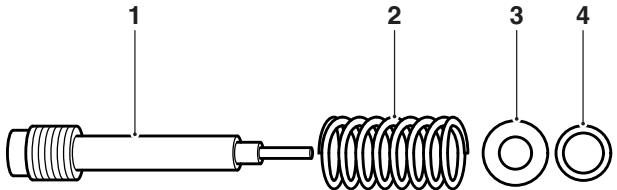


1. Cover
2. Spring
3. Valve diaphragm

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

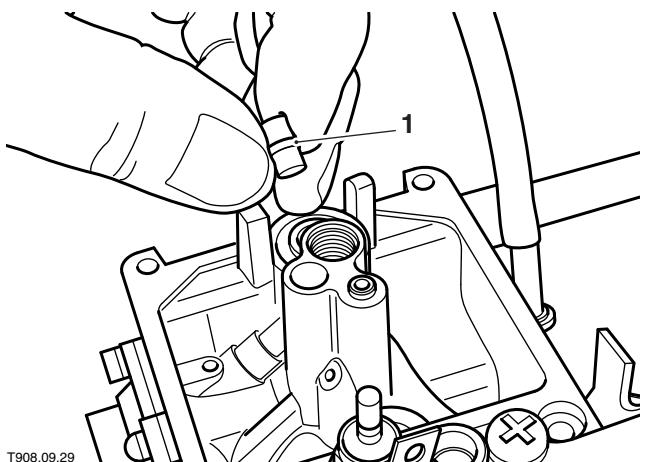
1. Pilot screw

2. Spring

3. Washer

4. O-ring

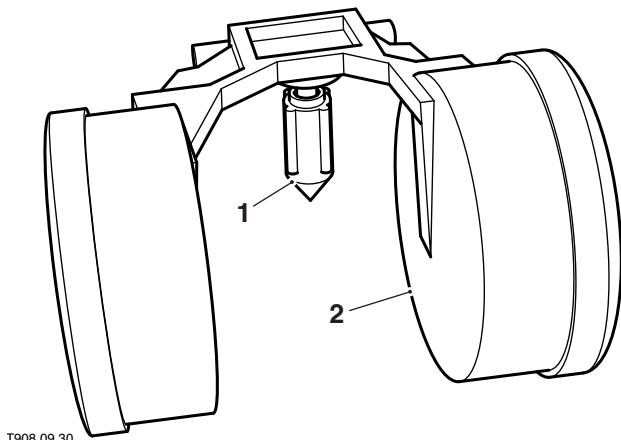
5. Fit the pilot jet.
6. Fit the needle jet to the carburettor. Ensure the jet is correctly seated (if it is not fitted the right way around it will not seat correctly) then screw in the needle jet holder.



1. Needle jet

Fuel System - Carburettor Models

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.

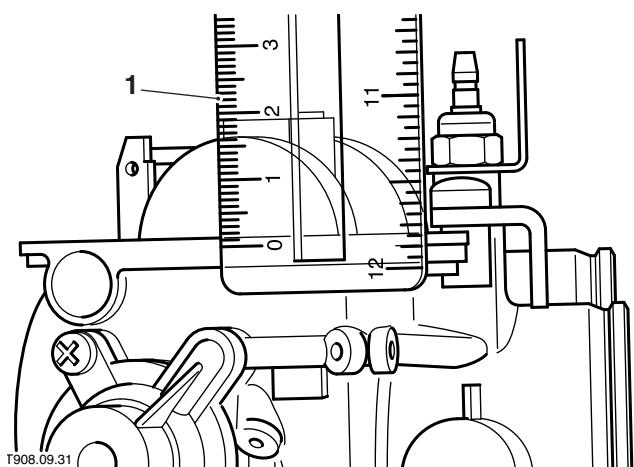


T908.09.30

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.

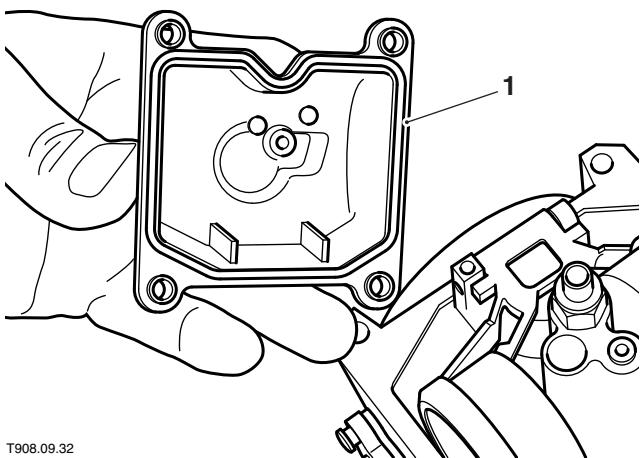


T908.09.31
1. Ruler for measuring 17 mm float height

Correct float height

17 mm +/- 1 mm

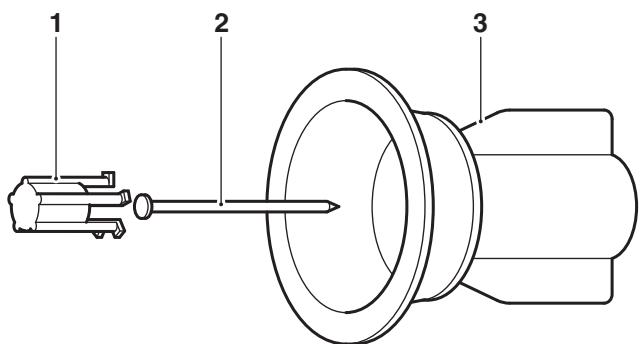
10. Fit the seal and install the float chamber. Ensure the seal is correctly located then securely tighten the retaining screws. On the left hand carburettor ensure the idle speed adjuster is refitted to the screws.



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.
14. Refit the carburetors (see page 10A-21).
15. Check the carburettor adjustment as necessary (see page 10A-27).

Carburettor Adjustment

Note:

- All carburettor adjustment should be made with the engine warmed up to normal operating temperature.

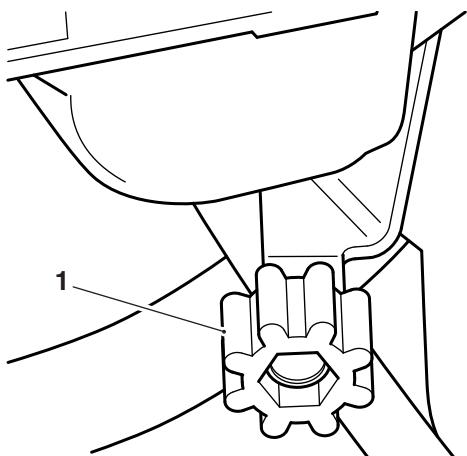
Idle speed adjustment

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 carburetors. Rotate the adjuster clockwise to increase idle speed and anti-clockwise to decrease it.

CORRECT SETTING - 1000 ± 50 rpm



T908.09.34

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 carburetors 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:

	America
Turns Out	1.5

	Speedmaster
Turns Out	2.0

Note:

- On models NOT fitted with a catalytic converter, if a gas analyser is available, the idle mixture can be checked by measuring the CO content of the exhaust gases at the silencer outlet.
- On 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.

Fuel System - Carburettor Models

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.

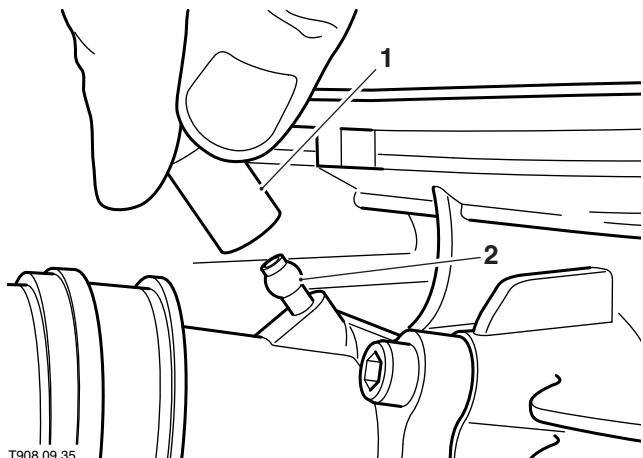
Note:

- 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.



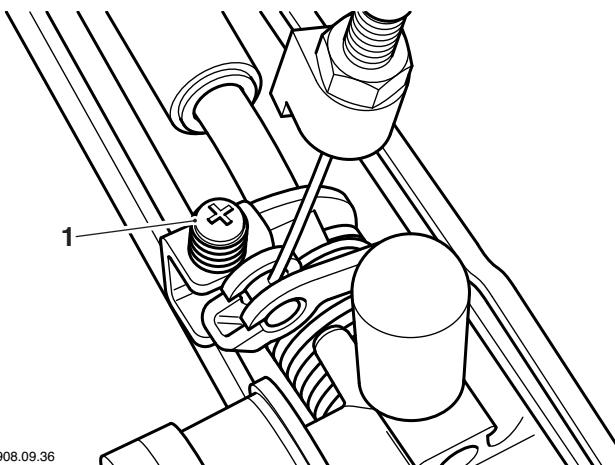
1. Rubber cap

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/Float 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.

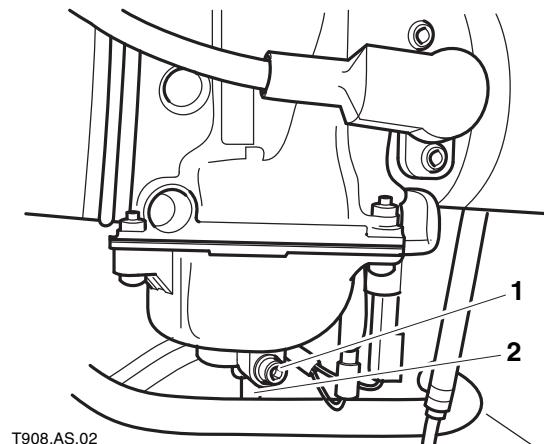
1. Place the motorcycle on level ground and securely support it in an upright position.



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.



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.

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.

Fuel System - Carburettor Models

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.



T908.09.37
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.

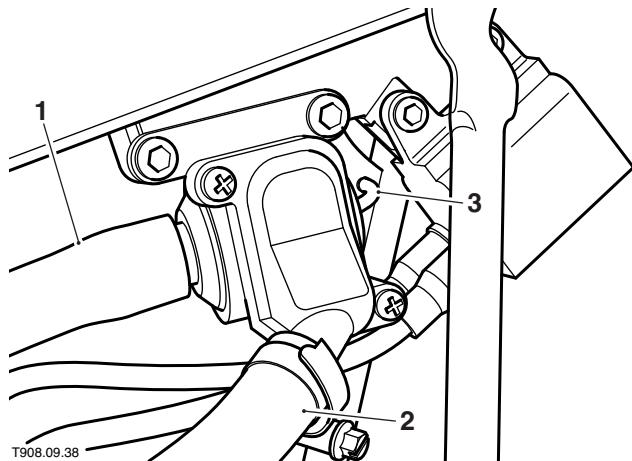
Check

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 (see page 10A-11).
2. Disconnect all hoses from the valve, noting the correct fitted location of each hose.

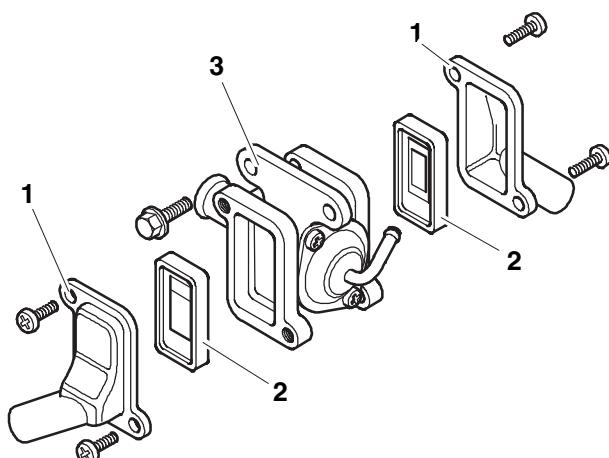


- 1. Airbox hose**
2. Cylinder head hose
3. Vacuum hose

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 interchangeable.



- 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 (see page 10A-12).

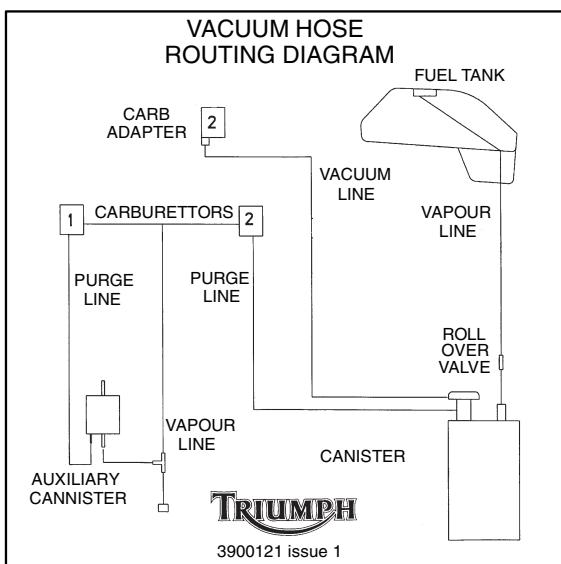
Fuel System - Carburettor Models

Evaporative Loss System - If Fitted

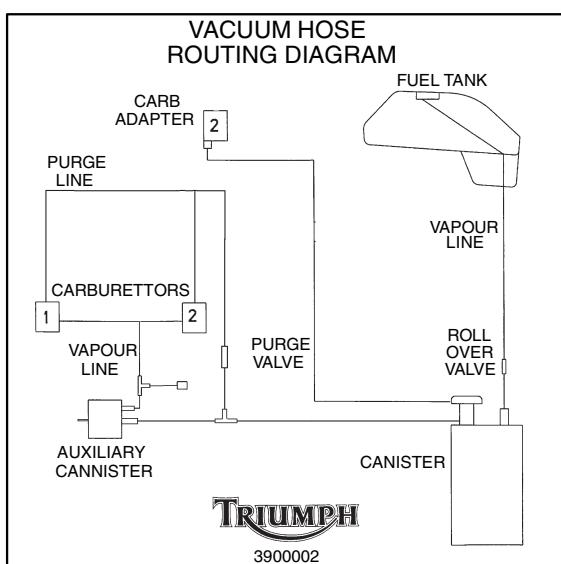
General information

Some models for certain markets 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 790 cc models equipped with an evaporative control system.



A label, as shown below, can be found on all 865 cc 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

790 cc 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.

865 cc 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 carburetors.

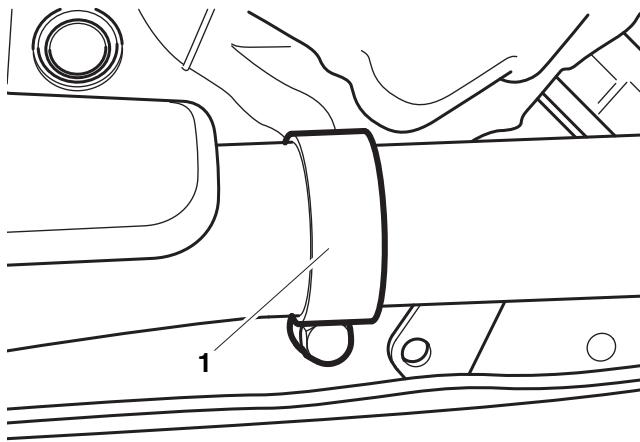
To allow air to enter the float chambers, the float chamber vent solenoid valve opens. Because air is constantly being drawn into the chambers while the engine is running, no fuel vapour escapes.

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

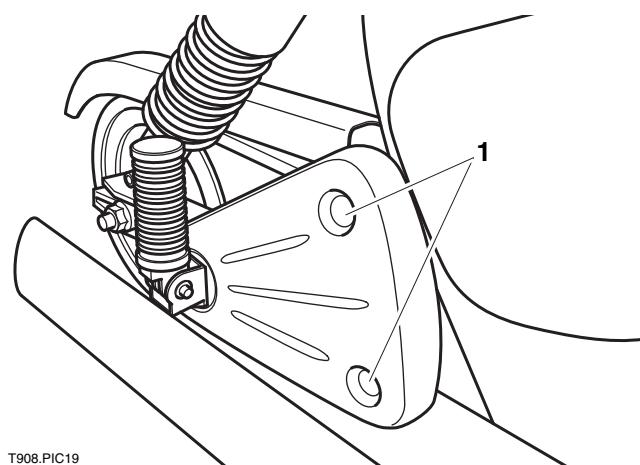
Removal

- Slacken the clamp securing the silencer to the header pipe.



1. Silencer clamp bolt

- Slacken and remove the two fixings securing the passenger footrest mounting plate to the frame.



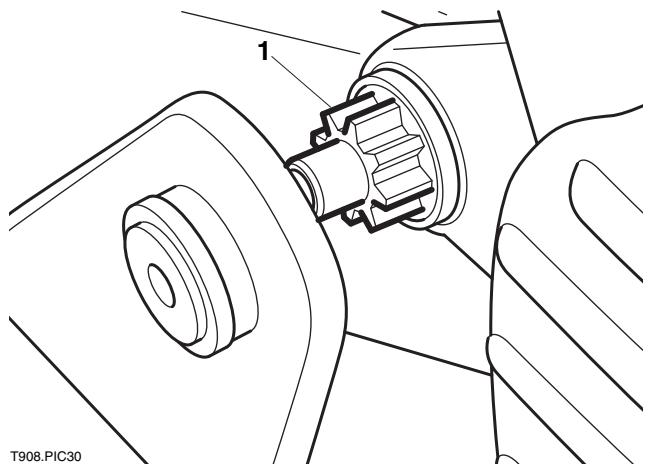
T908.PIC19

1. Passenger footrest mounting plate fixings

- Remove the passenger footrest mounting plate.
- Rotate the silencer away from the frame in order to dislodge the silencer mounting.
- With the silencer mounting clear of the frame, withdraw the silencer from the header pipe.

Installation

- Ensure the rubber mountings fitted to the mounting spigot.
- Apply 4 cc of clear silicone sealer to each header pipe at the joint with the silencer. Spread the sealer evenly all round the joint.
- Fit the mounting clamp then install the silencer to the header.
- Rotate the silencer until the mounting plate engages correctly with the mounting spigot/rubber.



1. Silencer mounting spigot/rubber

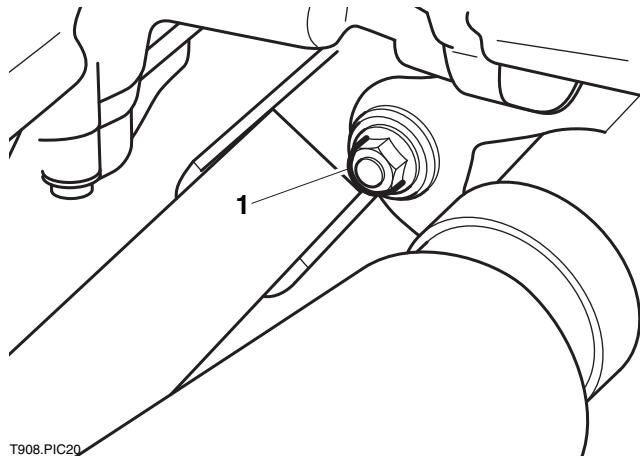
- Install the passenger footrest mounting plate. Fit the fixings and tighten to **15 Nm**.
- Position the silencer clamp correctly and tighten its bolt to **22 Nm**.

Fuel System - Carburettor Models

Header Pipes

Removal

1. Remove both silencers (see page 10A-33).
2. Remove the fixings securing the header pipes to the frame cradle tubes.



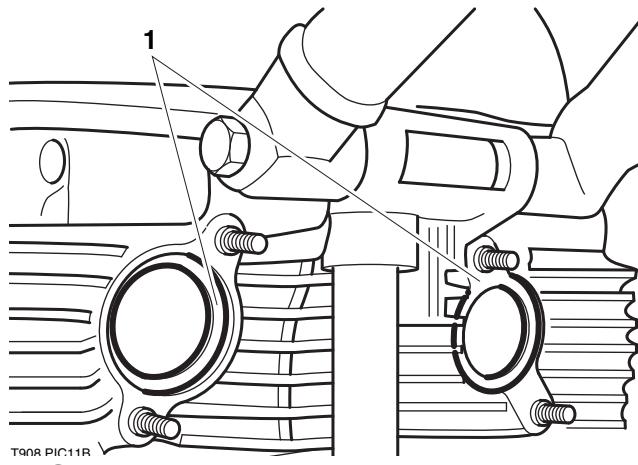
T908.PIC20

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.



T908.PIC11B
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 **22 Nm**.
8. Position the balance pipe clamp correctly and tighten its bolt to **15 Nm**.
9. Refit the silencers (see page 10A-33).

10B Fuel System - Fuel Injected Models

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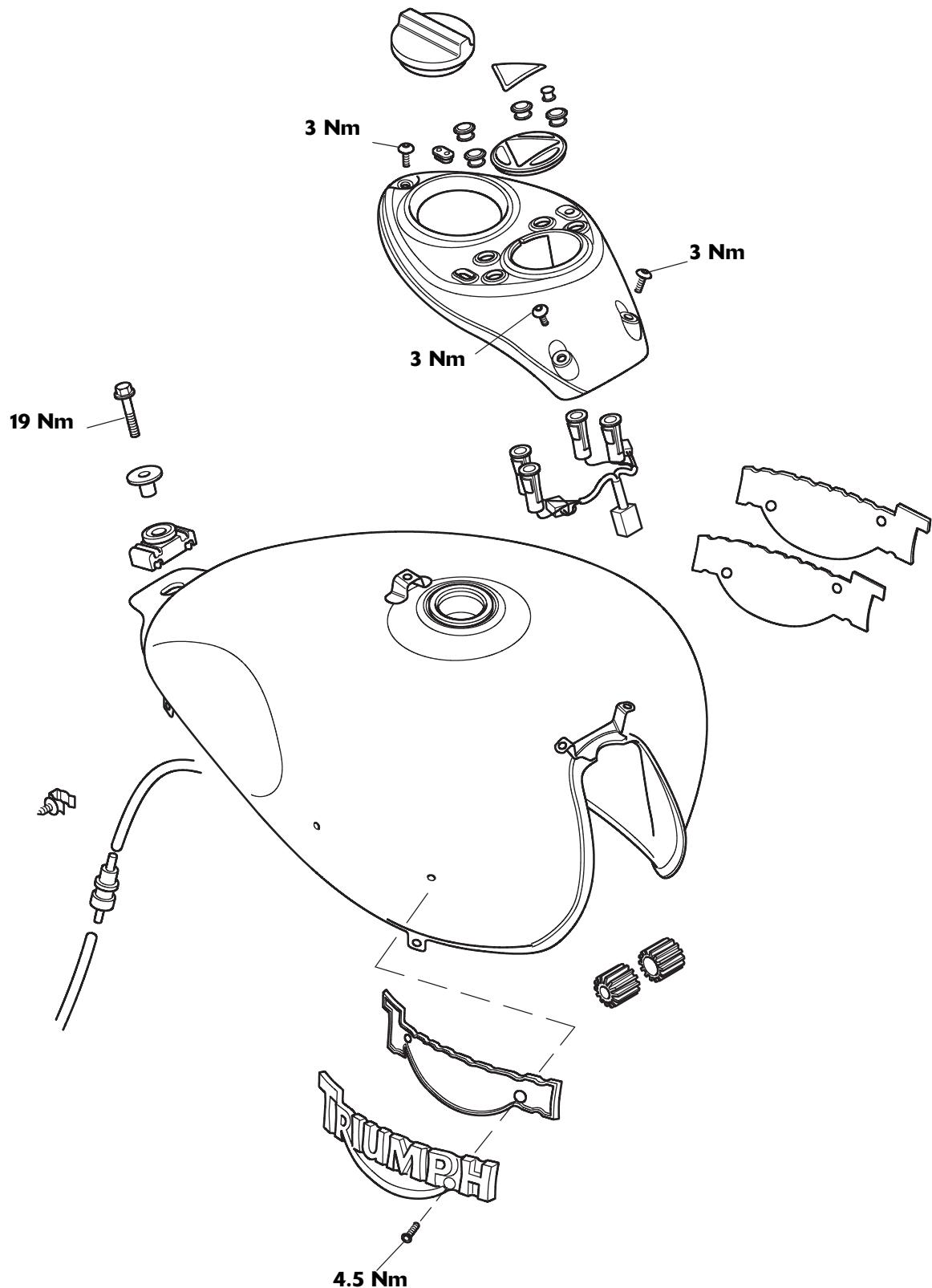
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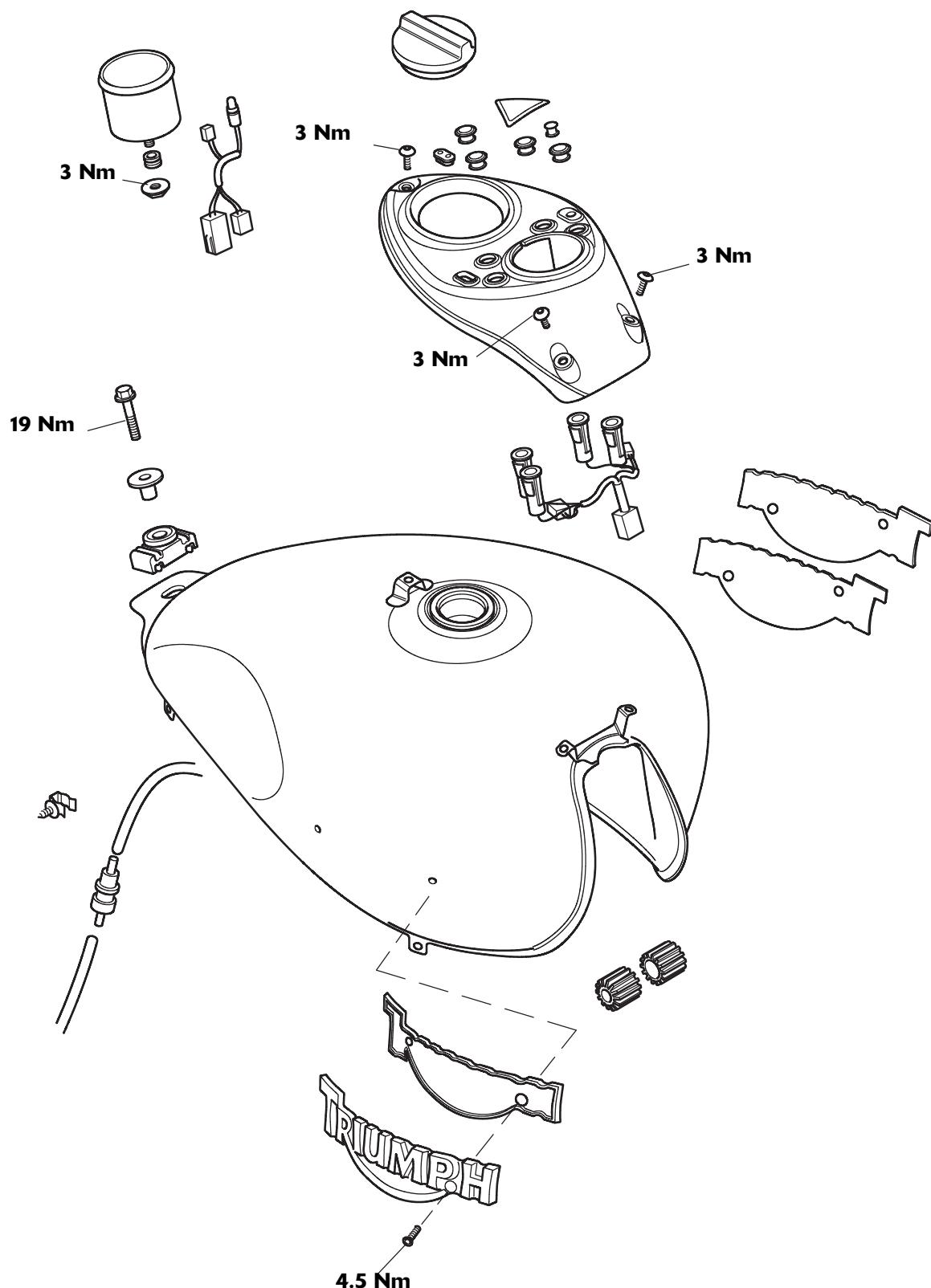
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Exploded View - Fuel Tank - America and America LT

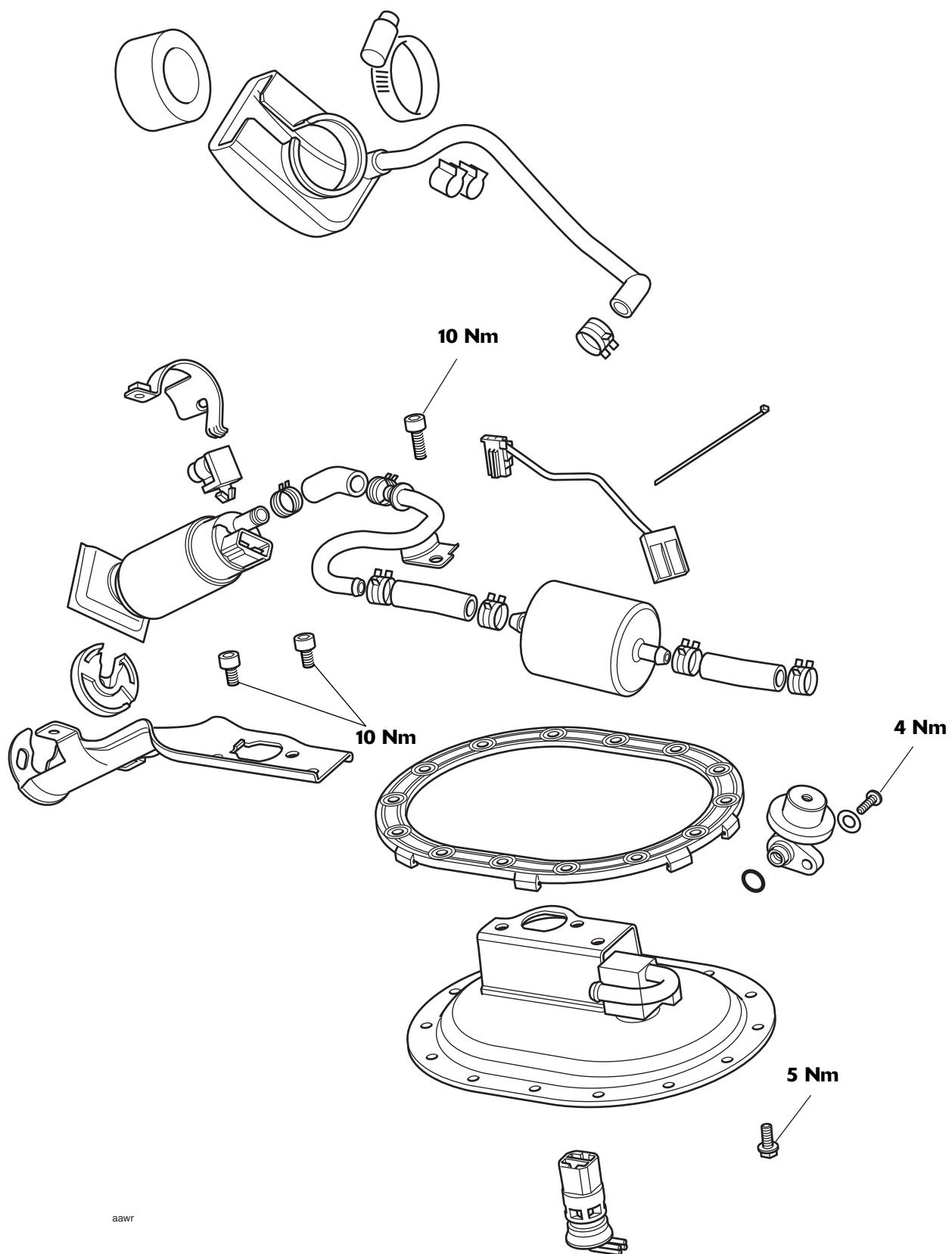


Fuel System - Fuel Injected Models

Exploded View - Fuel Tank - Speedmaster

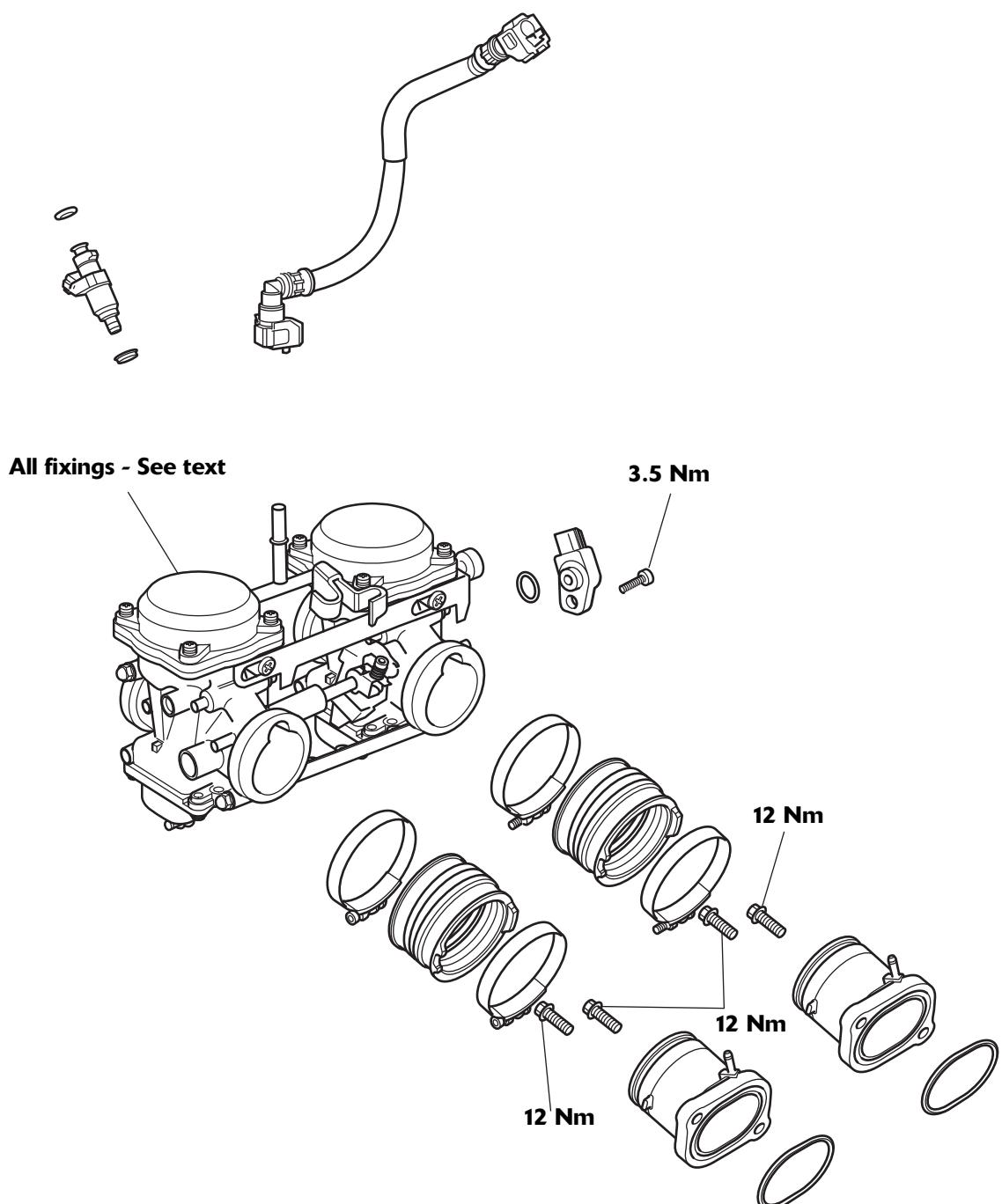


Exploded View - Fuel Pump

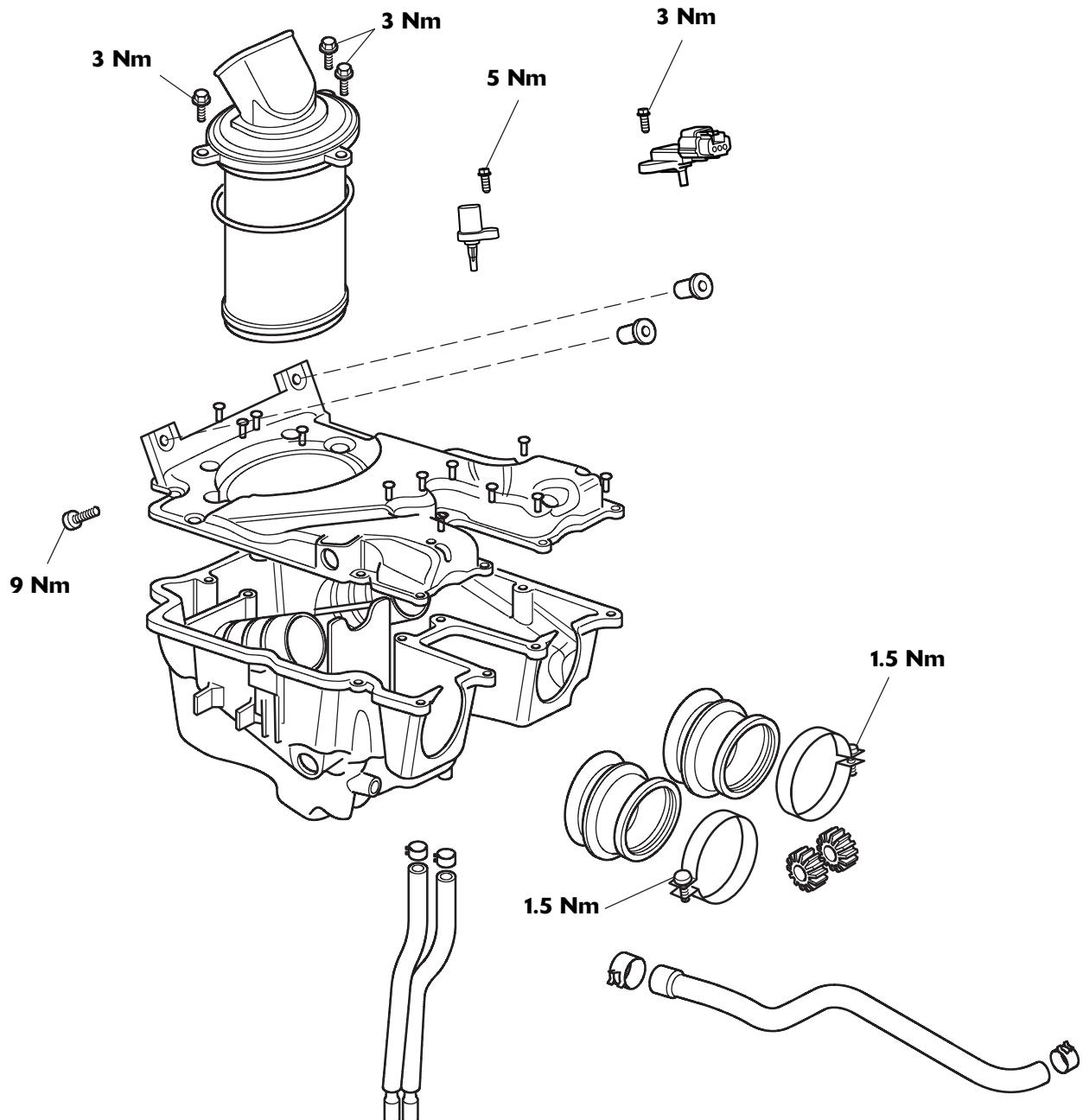


Fuel System - Fuel Injected Models

Exploded View - Fuel Rail, Throttles and Injectors

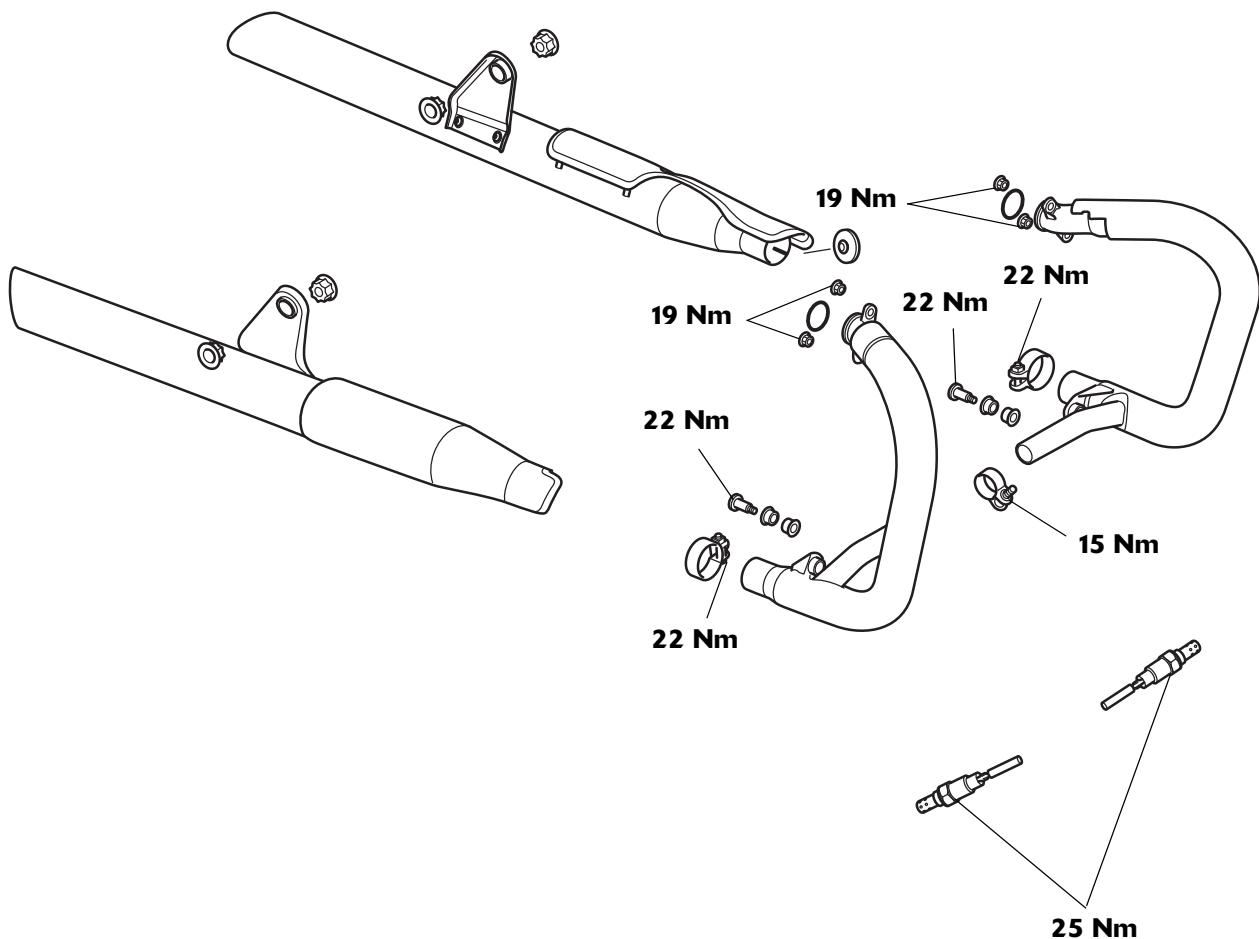


Exploded View - Airbox

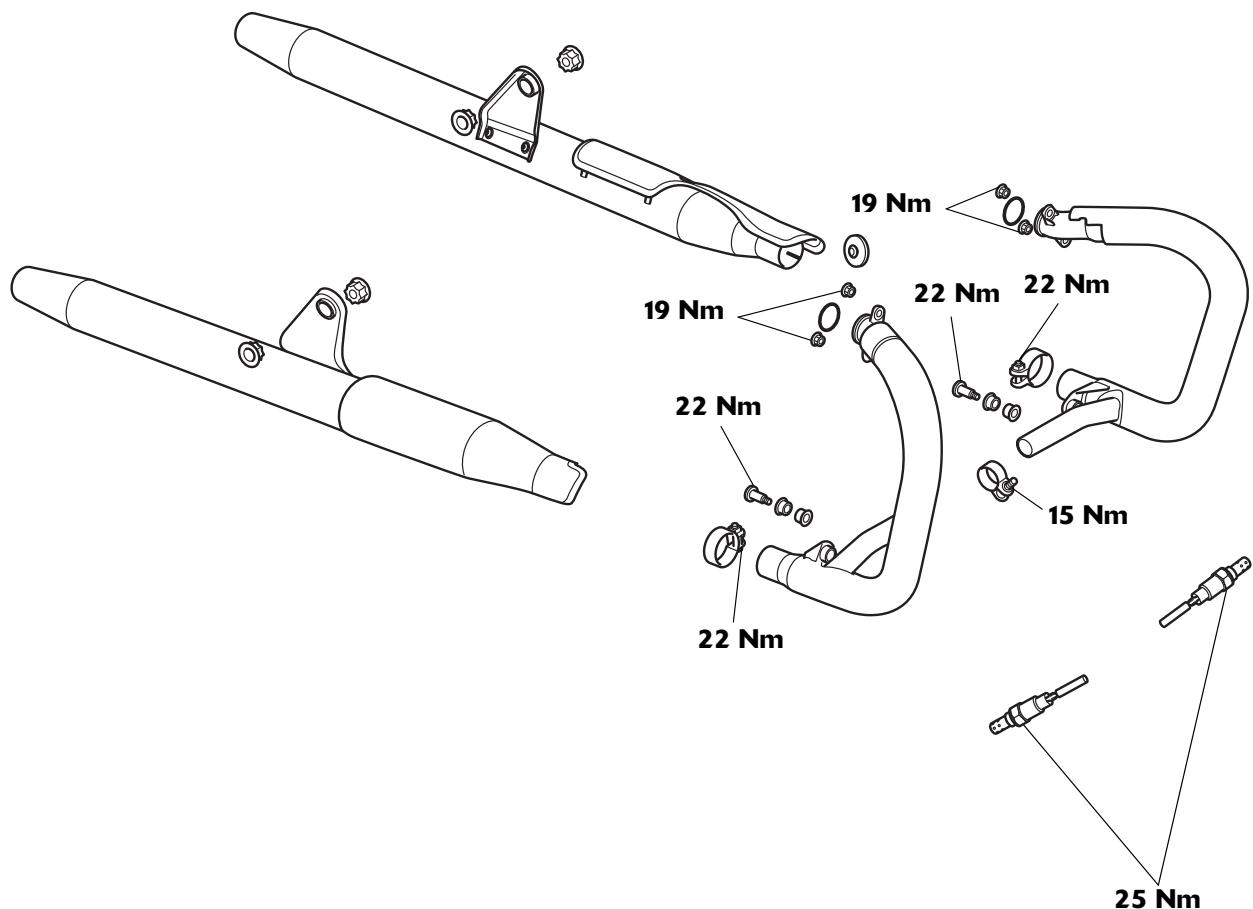


Fuel System - Fuel Injected Models

Exploded View - Exhaust System - Speedmaster

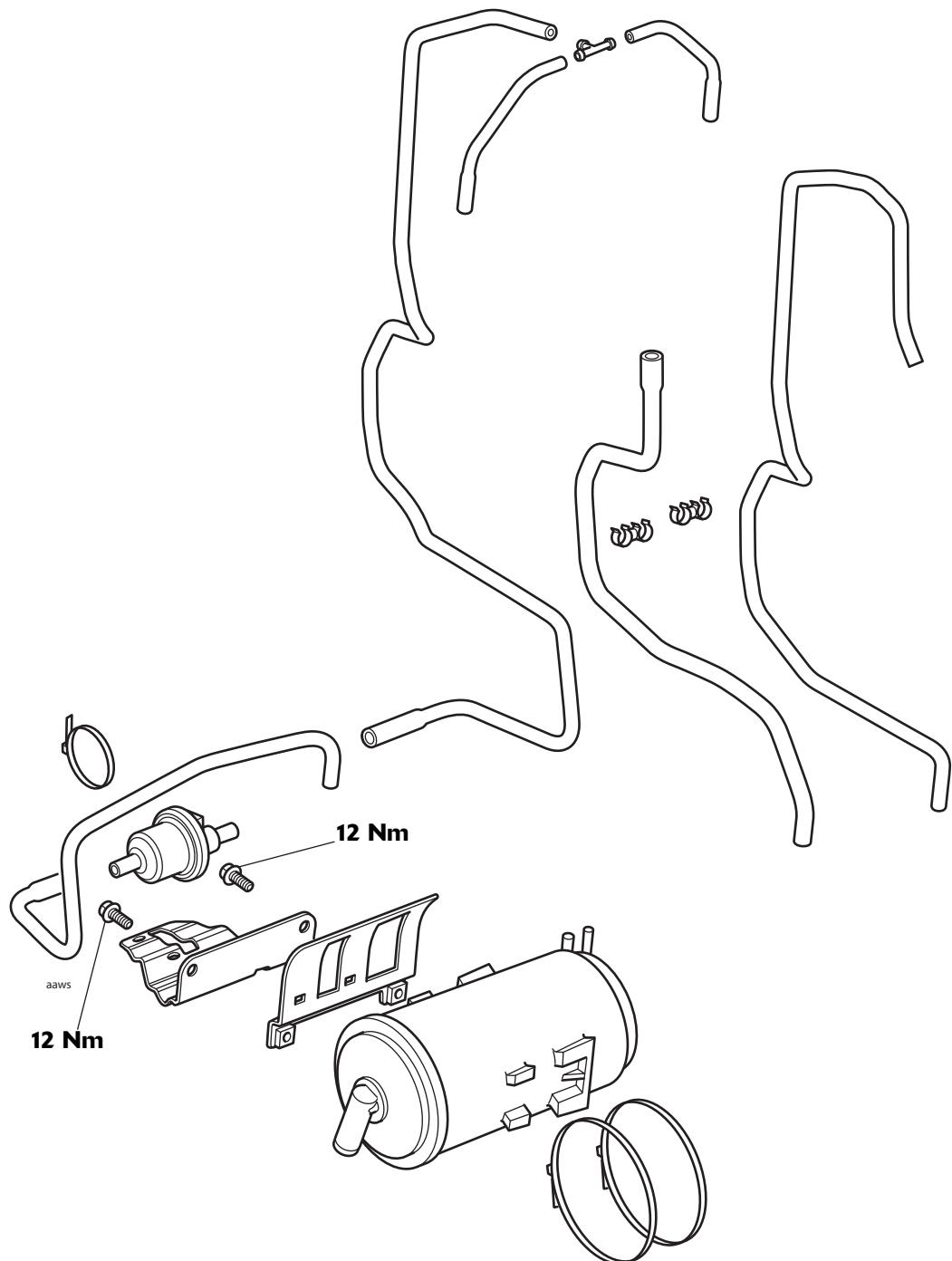


Exploded View - Exhaust System - America and America LT

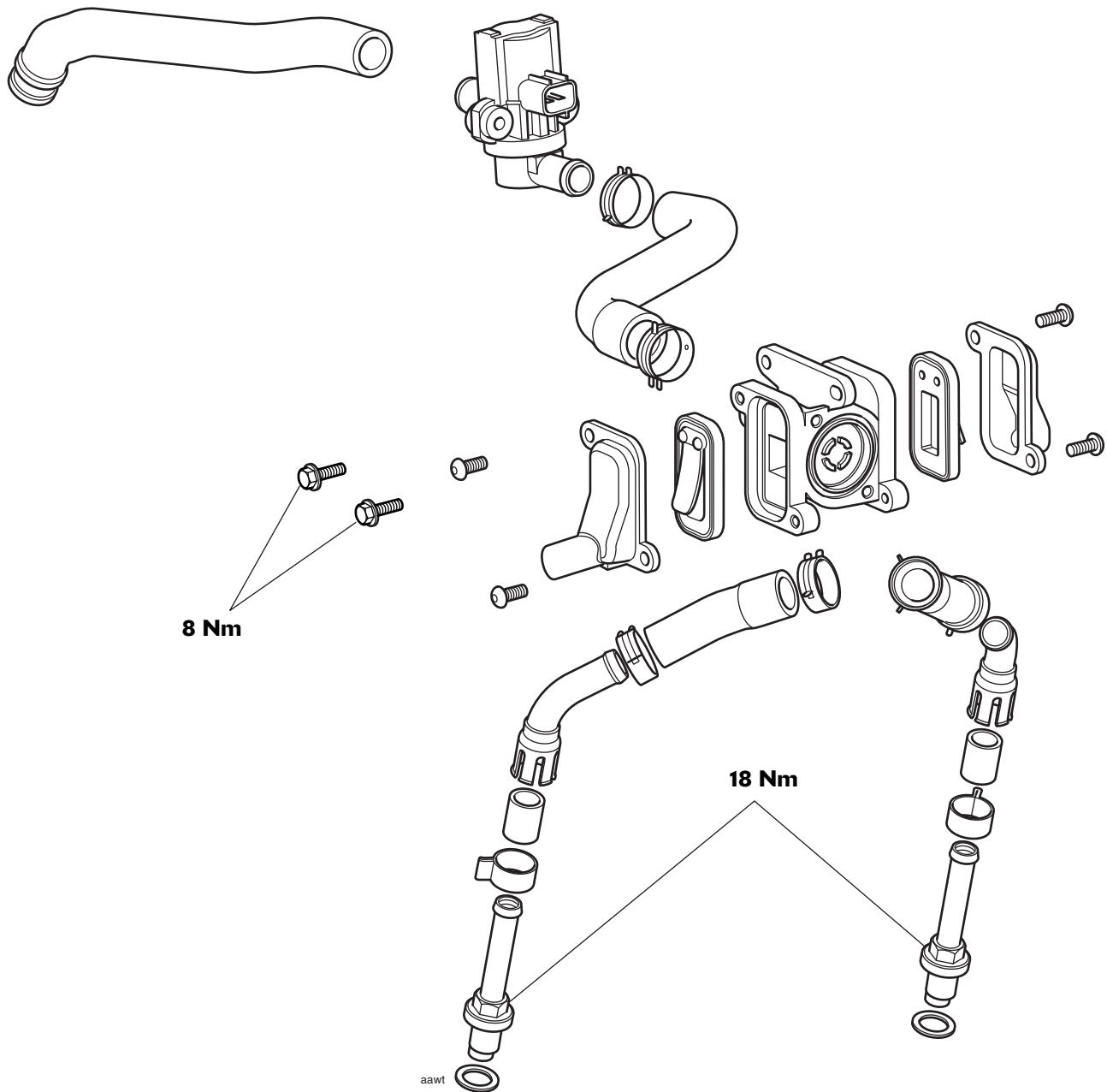


Fuel System - Fuel Injected Models

Exploded View - Evaporative System



Exploded View - Secondary Air Injection



Fuel System - Fuel Injected Models

Fuel Requirements

Fuel Requirements - all countries except USA

Outside of the United States of America, this model is designed to use unleaded fuel and will give optimum performance if the correct grade of fuel is used. Always use unleaded fuel with an octane rating of 91 RON or higher.

Fuel Requirements - 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: This model is designed to run on unleaded gasoline with a CLC or AKI octane rating (R+M)/2 of 87 or higher.

Note:

- If 'knocking' or 'pinking' occurs at a steady engine speed under normal load, use a different brand of gasoline or a higher octane rating.



Caution

The use of leaded gasoline is illegal in some countries, states or territories and will invalidate the vehicle and emissions control warranties. Additionally, leaded gasoline will cause damage to emissions control components.

Oxygenated Gasoline

To help in meeting clean air standards, some areas of the U.S. use oxygenated gasoline to help reduce harmful emissions. This model 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.

Glossary of Terms

The following terms and abbreviations will be found in this section. Below is given a brief explanation of what some of the more common terms and abbreviations mean.

Air temperature

The air temperature in the air box and intake system.

Air temperature sensor

Sensor located in the airbox to detect the temperature of the incoming air.

ATDC

After Top Dead Centre (TDC).

Barometric pressure

Pressure of the air in the airbox.

Battery voltage

The voltage at the input to the Electronic Control Module (ECM).

BTDC

Before Top Dead Centre (TDC).

Catalyst

Device placed in the exhaust system which reduces exhaust emissions by stimulating secondary combustion of the exhaust gases.

Closed throttle position

Throttle position at idle (i.e. against end stop), measured as a voltage and expressed as percentage.

Coolant temperature

The coolant temperature in the cylinder head.

Coolant temperature sensor

Sensor which detects coolant temperature.

Cooling fan status

The 'on' or 'off' condition of the cooling fan.

DTC

Diagnostic Trouble Code.

ECM

Engine Control Module.

Engine speed

The crankshaft revolutions per minute.

Freeze frame

A data set captured at the time a Diagnostic Trouble Code (DTC) is set.

Idle fuel trim

The percentage above or below the nominal fuel requirement for the volume of air entering at idle.

Fuel System - Fuel Injected Models

Idle fueling

Adjustment of fueling at idle to suit the actual air inducted.

Idle reference speed

The target idle speed as determined by the Electronic Control Module (ECM). (It should be the same as the actual idle speed if the motorcycle is operating correctly.)

Ignition advance

The timing of ignition at the spark plug relative to top dead centre.

Ignition switch position

The 'on' or 'off' position of either or both the ignition switch and the engine stop switch.

Ignition timing

Same as 'ignition advance'.

Injector pulse time

The time during which an injector remains open (i.e. delivering fuel).

Long term fuel trim

Fueling after adapting to the engine's long term fueling requirements (closed loop only). See also short term fuel trim.

MAP sensor

Manifold absolute pressure (the air pressure in the intake system).

MIL

Malfunction Indicator Lamp.

Illuminates when most Diagnostic Trouble Codes (DTCs) are set.

Neutral switch status

The 'neutral' or 'in gear' status of the gear change.

Off idle fuel trim

The percentage above or below the nominal fuel requirement for the volume of air entering at engine speeds other than idle. This function is not currently used in the Triumph system.

Open circuit

A break in an electrical circuit - current cannot flow.

Over temp

High temperature within the Electronic Control Module (ECM) caused by an internal or external failure.

Oxygen sensor

The oxygen sensor measures the oxygen levels in the exhaust gases and feeds this information to the ECM. Based on this information, adjustments to air/fuel ratio are made.

Fuel System - Fuel Injected Models

Primary Throttle Position Sensor

Sensor for the primary (lower) throttle position.

Primary Throttle Stepper Motor

Stepper motor used to vary throttle opening at idle and when the engine is cold.

Purge valve duty cycle

The time the purge valve is open in an open/close cycle, expressed as a percentage of the cycle time.

Road Speed Sensor

Gearbox mounted sensor which delivers information to the ECM that is converted to the road speed value that is displayed on the speedometer.

Sensor reference voltage

Supply voltage to the system sensors (nominally 5 volts).

Short circuit

A 'short cut' in an electrical circuit - current by-passes the intended circuit (usually to earth).

Short term fuel trim

A correction applied to the fuel mixture during closed loop catalyst operation. This, in turn has an effect on the long term fuel trim in that, if an engine constantly requires mixture correction, the long term fuel trim will adapt to this requirement thus reducing the need for constant short term adjustment.

Sidestand status

The 'up' or 'down' position of the side stand.

Target dwell time

The actual time from coil 'on' to coil 'off'.

Throttle position

The position of the throttle butterfly given as a percentage of the movement range. When the data is displayed on the tool, fully open need not be 100% nor fully closed 0%.

Throttle voltage

Voltage at the throttle potentiometer.

Vbatt

Battery voltage.

Fuel System - Fuel Injected Models

Engine Management System

System Description

The America, America LT and Speedmaster are fitted with an electronic engine management system which encompasses control of both ignition and fuel delivery. The electronic control module (ECM) draws information from sensors positioned around the engine, oil cooling and air intake systems and precisely calculates ignition advance and fueling requirements for all engine speeds and loads.

In addition, the system has an on-board diagnostic function. This ensures that, should a malfunction occur in the engine management system, the malfunction type, and engine data at the time the malfunction occurred, are stored in the ECM memory. This stored data can then be recovered using a special service tool which is mandatory for all Triumph dealers. In this way, precise diagnosis of a fault can be made and the fault quickly rectified.

System Sensors

- **Intake air temperature sensor** - situated in the top of the airbox. As the density of the air (and therefore the amount of oxygen available to ignite the fuel) changes with temperature, an intake air temperature sensor is fitted. Changes in air temperature (and therefore air density) are compensated for by adjusting the amount of fuel injected to a level consistent with clean combustion and low emissions.
- **Barometric pressure sensor** - situated in the top of the airbox. The barometric pressure sensor measures atmospheric air pressure. With this information, the amount of fuel per injection is adjusted to suit the prevailing conditions.
- **Manifold Absolute Pressure (MAP) sensors** - there are two fitted - situated at the left side of the main frame spine, connected to each throttle body by equal length tubes. The MAP sensor provides information to the ECM which is used at shallow throttle angles (very small throttle openings) to provide accurate engine load indications to the ECM. This degree of engine load accuracy allows the ECM to make very small adjustments to fuel and ignition which would otherwise not be possible from throttle angle data alone.
- **Clutch switch** - situated on the clutch lever. The clutch must be pulled in for the starter motor to operate.

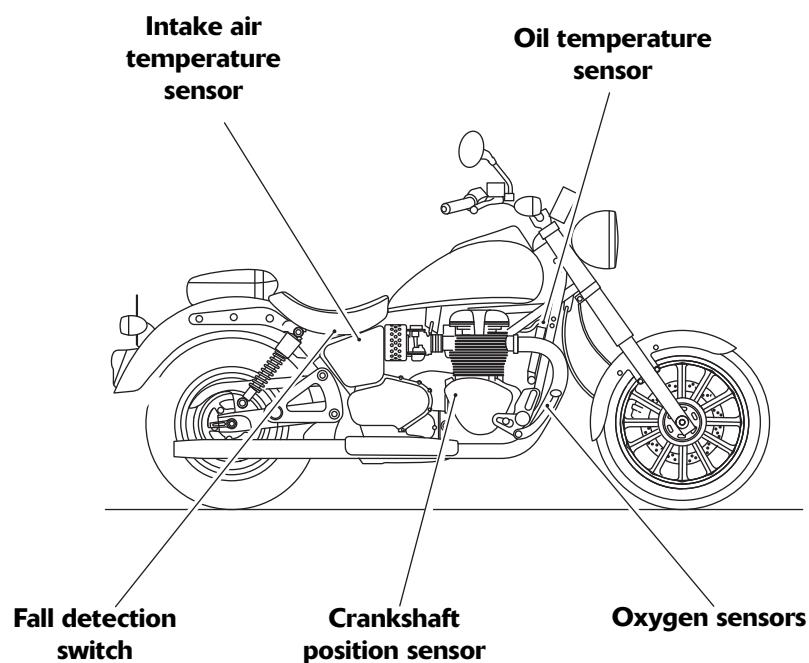
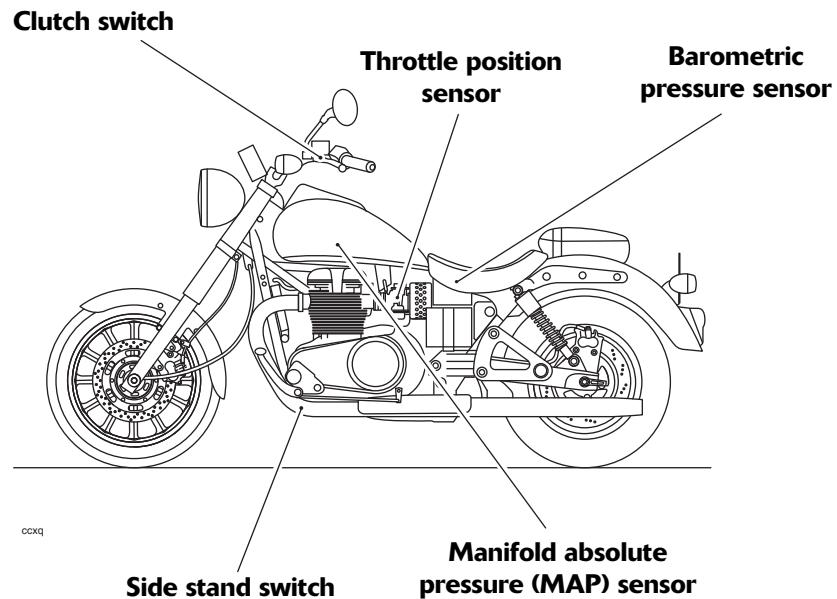
- **Crankshaft position sensor** - situated in the crankcase, near the alternator cover. The crankshaft position sensor detects movement of a toothed wheel attached to the alternator rotor. The toothed wheel gives a reference point from which the actual crankshaft position is calculated. The crankshaft position sensor information is used by the ECM to determine engine speed and crankshaft position in relation to the point where fuel is injected and ignition of the fuel occurs.
- **Engine oil temperature sensor** - situated at the oil cooler inlet union, on the upper right hand side of the oil cooler. Oil temperature information, received by the ECM, is used to optimise fueling at all engine temperatures and to calculate hot and cold start fueling requirements.
- **Throttle position sensor** - situated at the left end of the throttle body. Used to relay throttle position information to the ECM. Throttle opening angle is used by the ECM to determine fueling and ignition requirements for all throttle positions.
- **Oxygen sensors** - there are two fitted - situated in the exhaust header system upstream of the catalyst. The oxygen sensors constantly feed information to the ECM on the content of the exhaust gases. Based on this information, adjustments to air/fuel ratio are made.

IMPORTANT:

- **The oxygen sensor electrical connections must not be swapped between cylinders. If the connections are swapped over, engine malfunctions will occur.**
- **The right hand (Cylinder 2) oxygen sensor connector on the main harness is marked with red tape.**
- **The oxygen sensors are NOT marked, always ensure the right hand oxygen sensor harness is connected to the main harness connector identified with red tape.**
- **Side stand switch** - situated at the top of the sidestand leg. If the sidestand is in the down position, the engine will not run unless the transmission is in neutral.
- **Fall detection switch** - situated above the airbox. The fall detection switch will detect if the motorcycle is on its side and will cut power to the ECM immediately. This prevents the engine from running and the fuel pump from delivering fuel. In the event of a fall, the switch is reset by returning the bike to an upright position and switching the ignition off then back on again.

Fuel System - Fuel Injected Models

Sensor Locations



Fuel System - Fuel Injected Models

System Actuators

In response to signals received from the sensors, the ECM controls and directs messages to a series of electronic and electro-mechanical actuators. The function and location of the actuators is given below.

- **Canister purge valve (California models only)** - situated in the vapour return line between the carbon canister and the throttle bodies. The purge valve controls the return of vapour which has been stored in the carbon canister during the period when the engine is switched off. The valve is 'pulsed' by the ECM to give control over the rate at which the canister is purged.
- **Injectors** - located in the throttle body, one per cylinder. The spray pattern of the injectors is fixed but the length of time each injector can remain open is variable according to operating conditions. The duration of each injection is calculated by the ECM using data received from the various sensors in the system.
- **Ignition coils** - the two ignition coils are located above the cam cover, attached to the frame. There are two coils fitted, one for each spark plug. The ECM controls the point at which the coils are switched on and off. In calculating the switch-on time, the ECM allows sufficient time for the coils to charge to a level where a spark can be produced. The coils are switched off at the point of ignition, the timing of which is optimised for good engine performance.
- **Main power relay** - situated under the fuel tank, on the left side of the frame spine. When the ignition is switched on, the main power relay is powered up to provide a stable voltage supply for the ECM.
- **Fuel pump** - located inside the fuel tank. The electric pump delivers fuel into the fuel system, via a pressure regulator, at a constant 3.0 bar pressure. The pump is run continuously when the engine is operating and is also run briefly when the ignition is first switched on to ensure that 3.0 bar is available to the system as soon as the engine is cranked. Fuel pressure is controlled by a regulator also situated inside the fuel tank.

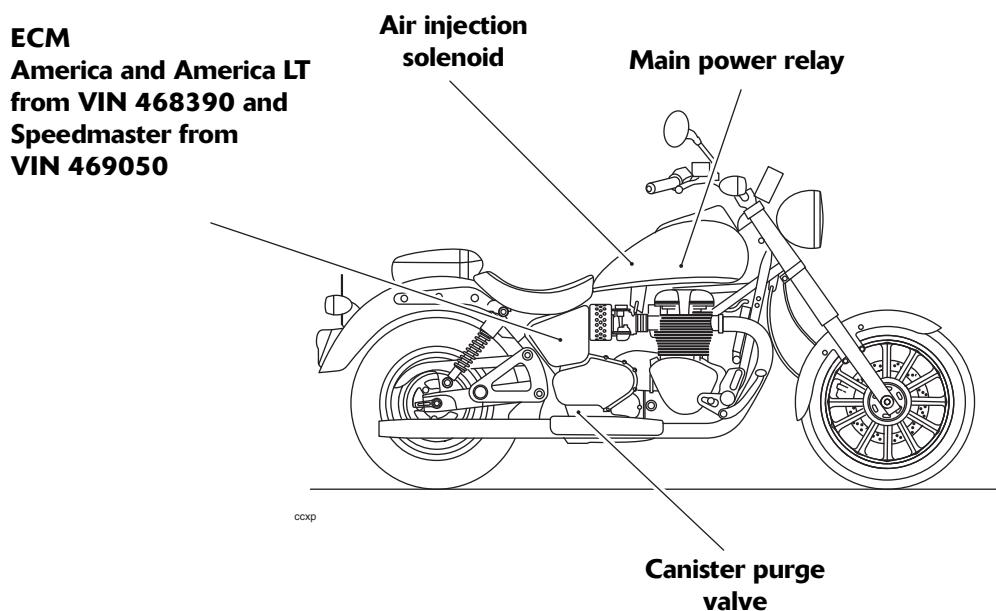
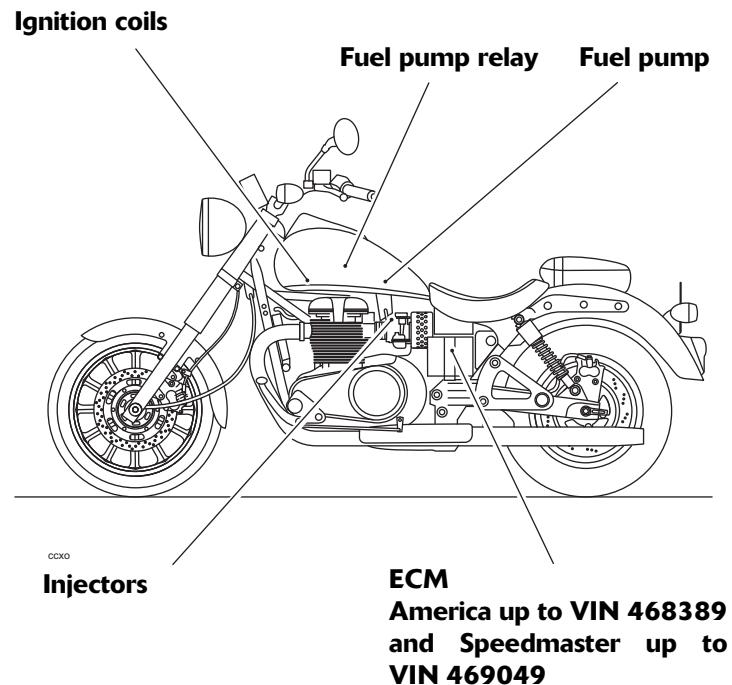
- **Fuel pump relay** - situated under the fuel tank on the left side of the frame spine. Power for the fuel pump is provided by the fuel pump relay, which is powered up by the ECM when the engine is running.
- **Secondary air injection solenoid** - located in front of the airbox. The secondary air injection solenoid controls airflow through the secondary air injection system.

Note:

- **Idle Speed Control (ISC) stepper motor - America, America LT and Speedmaster models do not have an ISC stepper motor fitted. Idle speed adjustment is by a manual adjuster fitted below the left hand side of the throttle body.**
- **In this system, the starter lockout system (clutch switch, neutral switch, sidestand switch) all operate through the engine management ECM.**

Fuel System - Fuel Injected Models

Actuator Locations



Fuel System - Fuel Injected Models

Engine Management Circuit Diagram - America and Speedmaster - Models with Cable Driven Speedometer

Key To Wiring Circuit Diagram

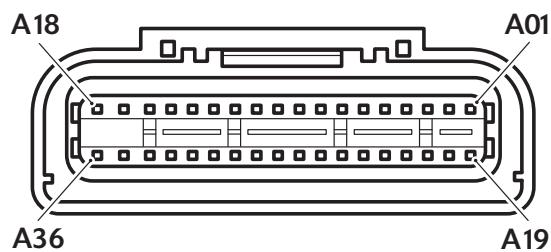
Key	Item Description
1	Engine Control Module
2	Diagnostic Connector
3	Neutral Switch
4	Instrument Assembly
5	Instrument Warning LEDs
6	Clutch Switch
7	Starter Relay
8	Sidestand Switch
9	Fuel level Sender
10	Fall Detection Switch
11	Ambient Air Temperature Sensor
12	Intake Air Temperature Sensor
13	Left hand MAP Sensor
14	Right hand MAP sensor
15	Oil Temperature Sensor
16	Oxygen Sensor - cylinder 1
17	Throttle Position Sensor
18	Fuel Pump
19	Fuel Pump Relay
20	Power Ground
21	Logic (sensor) Ground
22	Ignition Coils
23	Fuel Injectors
24	Purge Valve
25	Exhaust Air Injection Solenoid
26	Crankshaft Sensor
27	Engine Management System Relay
28	Oxygen Sensor - cylinder 2

Key To Wiring Colour Codes

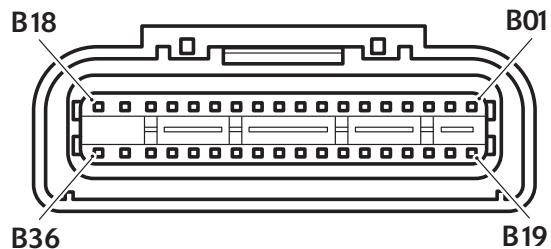
Code	Wiring Colour
B	Black
U	Blue
N	Brown
G	Green
S	Slate/Grey
O	Orange
K	Pink
R	Red
P	Purple
W	White
Y	Yellow
LG	Light Green
LU	Light Blue

ECM Connector Pin Numbering

Connector A (Black)



Connector B (Grey)

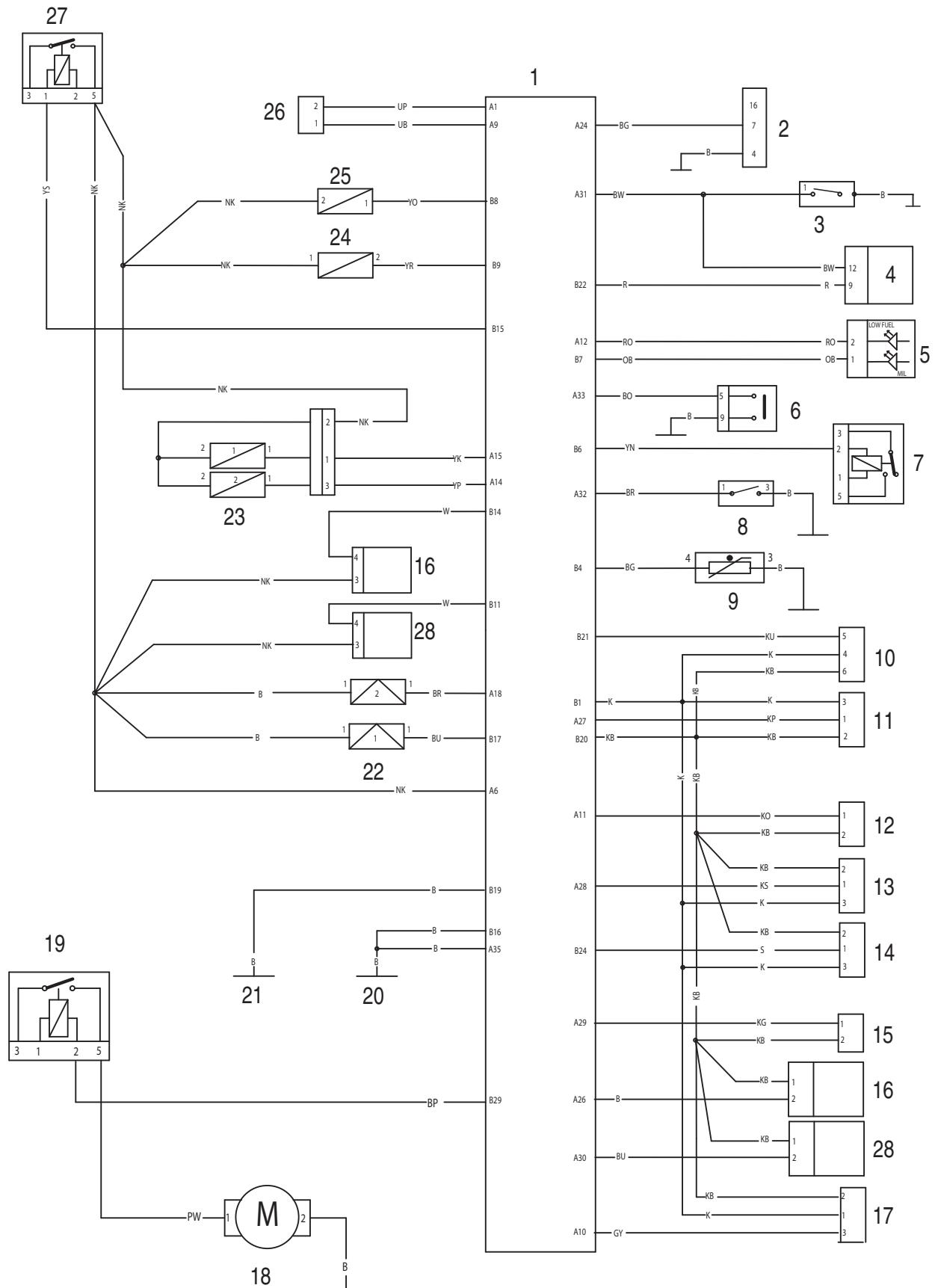


The above illustration shows the pin numbering system used in the engine management circuit diagram.

The black connector's pins are prefixed A and the grey connector's pins B. As viewed on the mating face with the ECM (as per the illustration), pins are numbered from right to left with number one in the top right corner.

Fuel System - Fuel Injected Models

Circuit Diagram - Engine Management System - America and Speedmaster -
Models with Cable Driven Speedometer



Fuel System - Fuel Injected Models

Engine Management Circuit Diagram - America, America LT and Speedmaster - Models with Electronic Speedometer

Key To Wiring Circuit Diagram

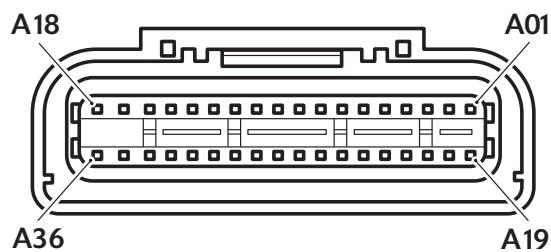
Key	Item Description
1	Engine Control Module
2	Diagnostic Connector
3	Instrument Speedometer
4	Instrument Tachometer
5	Vehicle Speed Sensor
6	Starter Relay
7	Clutch Switch
8	Intake Air Temperature Sensor
9	Throttle Position Sensor
10	Fall Detection Switch
11	Barometric Pressure Sensor
12	Right hand MAP sensor
13	Left hand MAP Sensor
14	Oil Temperature Sensor
15	Oxygen Sensor - cylinder 2
16	Oxygen Sensor - cylinder 1
17	Neutral Switch
18	Sidestand Switch
19	Fuel level Sender
20	Alarm Unit
21	Engine Stop Switch
22	Fuel Pump
23	Fuel Pump Relay
24	Fuse Box (fuse 4)
25a	Ignition Coil 1
25b	Ignition Coil 1
26	Fuel Injectors
27	Crankshaft Sensor
28	Exhaust Air Injection Solenoid
29	Purge Valve
30	Engine Management System Relay

Key To Wiring Colour Codes

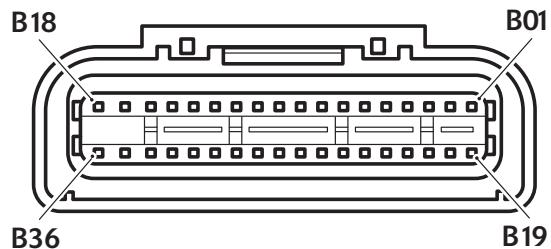
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U	Blue
N	Brown
G	Green
R	Red
S	Slate/Grey
O	Orange
K	Pink
P	Purple
W	White
Y	Yellow
LG	Light Green
LU	Light Blue

ECM Connector Pin Numbering

Connector A (Black)



Connector B (Grey)

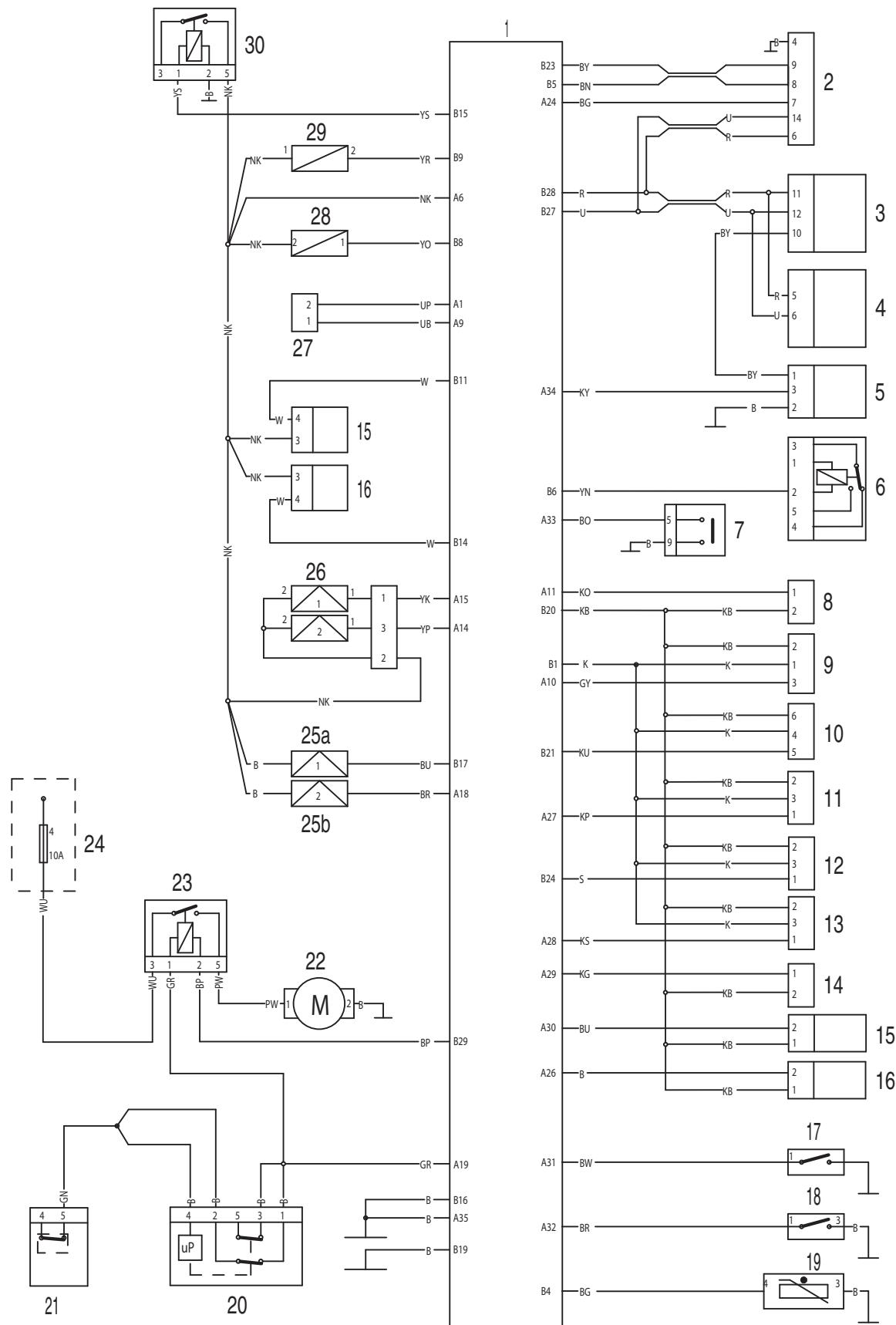


The above illustration shows the pin numbering system used in the engine management circuit diagram.

The black connector's pins are prefixed A and the grey connector's pins B. As viewed on the mating face with the ECM (as per the illustration), pins are numbered from right to left with number one in the top right corner.

Fuel System - Fuel Injected Models

Circuit Diagram - Engine Management System - America, America LT and Speedmaster - Models with Electronic Speedometer



Fuel System - Fuel Injected Models

System Diagnostics

The engine management system has an on-board diagnostics feature which allows service technicians to retrieve stored data from the ECM using Triumph diagnostic software. **Full details of the Triumph diagnostic software operation and how to interpret the results are given in the Triumph Diagnostic Tool User Guide.**

The tool is connected to the motorcycle using a dedicated diagnostic plug situated beneath the seat. By using a dedicated plug, no electrical connectors associated with the system are disturbed, reducing potential connector damage.

The tool allows the user to retrieve data associated with the system sensors and actuators, test various component functions, read build data and make minor adjustments to the set-up of the system. The data and tests available are described on the following pages.

On-board Fault Detection System

The on-board diagnostic system has two stages to fault detection. When a fault is detected, the DSM (Diagnostic Status Manager) raises a flag to indicate that a fault is present and increments a counter. The counter checks the number of instances that the fault is noted. For example, if there is a fault in the crankshaft position sensor, the counter will increment its count each time the crankshaft turns through 360°, provided the fault is still present.

When the count begins, the fault is detected but not confirmed. If the fault continues to be detected and the count reaches a pre-determined threshold, the fault becomes confirmed. If the fault is an emissions related fault or a serious malfunction affecting engine performance, a DTC (Diagnostic Trouble Code) and freeze-frame data will be logged in the ECM's memory and the MIL (Malfunction Indicator Lamp) on the motorcycle instrument panel is illuminated. Once a fault is confirmed, the number of warm-up cycles made by the engine is counted. If the fault clears, the warm-up cycle counter will extinguish the MIL (Malfunction Indicator Lamp) at a pre-determined count, and erase the DTC and freeze frame data from the ECM memory at another (higher) count.

A single warm-up cycle is deemed to have taken place when the following criteria have been met:

- The engine temperature must be raised to 72°C or more.
- The engine temperature must have risen by 23°C or more from its start temperature, when 72°C is reached.
- A controlled power-down sequence must take place.

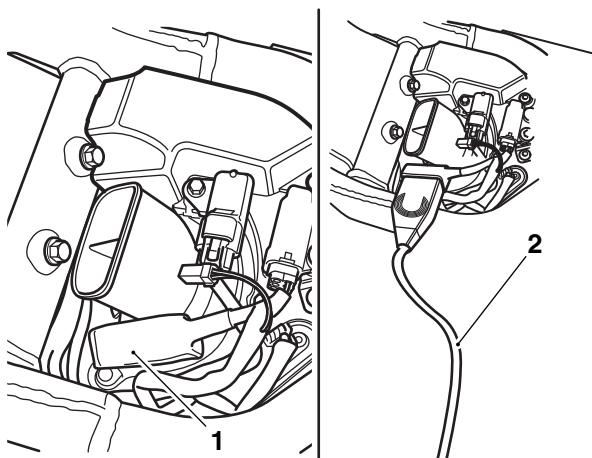
Note:

- When a fault has been rectified, the MIL will remain illuminated until sufficient non-fault warm-up cycles have taken place to turn it off. The MIL will be immediately extinguished if, after first rectifying the fault, the DTC (diagnostic trouble code) that caused the MIL illumination is erased from the ECM memory using the Triumph diagnostic tool.

Note:

- In most cases, when a fault is detected, the engine management system will revert to a 'limp-home' mode. In this mode, the engine will still function though the performance and fuel economy may be marginally affected. In some cases, the rider may not notice any appreciable difference from normal operation.

Diagnostic Tool Connection



1. Connection to main harness
2. Triumph diagnostic interface

1. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390) and release the diagnostic connector from its locating tang.
2. Connect the Triumph diagnostic interface to the dedicated multiplug, located beneath the seat.
3. When the diagnostic session is completed, disconnect the Triumph diagnostic interface.
4. Refit the diagnostic connector to its locating tang and refit the seat (see page 16-16).

Triumph Diagnostic Tool

Described on the following pages is the range of information which can be retrieved from the ECM's memory and the adjustments which can be performed using the Triumph diagnostic software.

The tables indicate which tests are performed by the on-board system and what information can be retrieved by the Triumph diagnostic software.

Note:

- **Full details of how to operate the software and how to interpret the data can be found in the Triumph Diagnostic Tool User Guide, which can be downloaded by authorised Triumph dealers from www.triumphonline.net.**

Build Data

The **Build Data** screen will display the following information:

- Motorcycle model
- Vehicle Identification Number (VIN)
- ECM type
- ECM ID
- ECM serial number
- Tune number
- Date of last tune download
- Total tune downloads since manufacture
- The lock status of the ECM (ECM Locked, Unlocked or Not Applicable).

Current Data

The data available under Current Data is:

Function Examined	Result Reported (Scale)
Fuel system status 1	open or closed loop operation
Fuel system status 2	open or closed loop operation/engine not running
Calculated load value	%
Engine coolant temperature	°C
Short term fuel trim - Bank 1	%
Short term fuel trim - Bank 2	%
Intake manifold absolute pressure	mmHg
Engine speed	RPM
Vehicle speed	km/h
Ignition timing advance - cylinder 1	degrees
Intake air temperature	°C
Absolute throttle position	%
Bank 1 - oxygen sensor 1	Volts
Bank 1 - oxygen sensor 1 - short term fuel trim	%
Bank 2 - oxygen sensor 2	Volts
Bank 2 - oxygen sensor 2 - short term fuel trim	%

Fuel System - Fuel Injected Models

Sensor Data

When using this function it is possible to check the status of various sensors and actuators.

The data sets are divided into seven groups - Sensor Voltages; Sensor Readings; Injector Data; Ignition Data; Idle Speed, Throttle Data and Inputs and Adaption Status. Each of these screens is described on the following pages.

Sensor Voltages

The data available under Sensor Voltages is:

Item Checked	Result Unit
Battery voltage	Volts
Voltage from ignition switch to ECU	Volts
Air temperature sensor voltage	Volts
Coolant temperature sensor voltage	Volts
Atmospheric pressure sensor voltage	Volts
Manifold absolute pressure sensor 1 voltage	Volts
Manifold absolute pressure sensor 2 voltage	Volts
Throttle position sensor voltage	Volts
Fuel level sensor voltage	Volts
Oxygen sensor output 1 voltage	Volts
Oxygen sensor output 2 voltage	Volts

Sensor Readings

The data available under Sensor Readings is:

Item Checked	Result Unit
Air temperature	°C
Coolant temperature	°C
Atmospheric (barometric) pressure	mmHg
Manifold absolute pressure (one reading per cylinder)	mmHg
Low fuel light	on/off
Oxygen sensor 1 heater status	on/off
Oxygen sensor 2 heater status	on/off

Fuel System - Fuel Injected Models

Injector Data

The data available under Injector Data is:

Item Checked	Result Unit
Injector 1 pulse time	milliseconds
Injector 2 pulse time	milliseconds

Ignition Data

The data available under Ignition Data is:

Item Checked	Result Unit
Ignition timing cyl 1	degrees BTDC
Ignition timing cyl 2	degrees BTDC
Coil 1 dwell time	milliseconds
Coil 2 dwell time	milliseconds

Idle Speed and Throttle Data

The data available under Idle Speed and Throttle Data is:

Item Checked	Result Unit
Engine speed	RPM
Idle reference speed	RPM
Throttle position	% open
Secondary air injection status	SAI on/off

Fuel System - Fuel Injected Models

Inputs

The data available under Inputs is:

Item Checked	Result Unit
EMS Main relay status	relay on/off
Fuel pump relay status	on/off
Starter relay status	starter on/off
Starter switch status	switch on/off
Side stand status	up/down
Fall detection status	normal/over
Clutch switch status	release/grip
Neutral switch	gear/neutral
Vehicle speed	km/h
Malfunction indicator light status	MIL on/off
Calculated load	%
Purge valve duty cycle	%

Adaption status

Because the fuel system is adaptive, the engine management system is able to automatically adjust to new working conditions, such as changes in fuel quality, component wear, air leaks etc. This screen displays information on the adaption status of the vehicle which will show if it has adapted or not.

Function Examined	Report Method
Closed throttle position adapted	adapted/not adapted
Idle speed control adaption status	%
Oxygen sensor 1 adaption range (off idle)	%
Oxygen sensor 1 adaption range (idle)	%
Oxygen sensor 1 adaption status (off idle)	%
Oxygen sensor 1 adaption status (idle)	%
Oxygen sensor 2 adaption range (off idle)	%
Oxygen sensor 2 adaption range (idle)	%
Oxygen sensor 2 adaption status (off idle)	%
Oxygen sensor 2 adaption status (idle)	%

Function Tests

The system allows the diagnostic software to perform a series of function tests on various actuators in the engine management system. In some cases it is necessary to make a visual observation of a component and in others, if faults are present, DTCs will be logged.

The Function Tests available are:

Function Examined	Report Method
Instrument panel	Observe instrument panel, refer to service manual
Purge valve	Listen for valve operation/Stored fault code*
Fuel pump - priming	Listen for fuel pump operation/Stored fault code*
Fuel pump - continuous operation	Fuel pressure test/Listen for fuel pump operation/Stored fault code*
Secondary air injection	Listen for valve operation/Stored fault code*

* If a fault is detected.

Adjust Tune

Using the Triumph diagnostic software, it is possible to:

- reset the adaptions
- balance the throttle bodies.

Further functions are provided to allow correct replacement and adjustment of the:

- throttle position sensor.

These functions are needed as, after replacement of the parts concerned, adjustments have to be made to specific Voltage settings, with the throttles set in a specific position.

To reset the adaptions, see page *10B-100*.

To replace and adjust the throttle position sensor, see page *10B-97*.

To balance the throttles, see page *10B-99*.

Fuel System - Fuel Injected Models

Freeze frame Data

Freeze frame data is stored at the time a DTC is recorded (confirmed) by the ECM. If multiple DTCs are recorded, the freeze frame data which is stored will relate to the first recorded DTC only.

By calling up freeze frame data associated with the first recorded DTC, the technician can check the engine condition at the time the fault occurred. The data available is:

Function Examined	Result Reported (Scale)
DTC	Diagnostic Trouble Code (DTC) number
Fuel system status 1	open or closed loop operation
Fuel system status 2	open or closed loop operation
Calculated load	%
Coolant temperature	°C
Short term fuel trim - bank 1	%
Short term fuel trim - bank 2	%
Intake manifold absolute pressure	mmHg
Engine speed	RPM
Vehicle speed	km/h
Ignition advance	degrees
Intake air temperature	°C
Throttle position	%
Oxygen sensor 1 output Voltage	Volts
Oxygen sensor 1 short term fuel trim	%
Oxygen sensor 2 output Voltage	Volts
Oxygen sensor 2 short term fuel trim	%

Diagnostic Trouble Codes

Diagnostic trouble codes (DTCs) are logged in the ECM memory when there is a confirmed fault in the system.

The codes are reported to the Triumph diagnostic tool as a four digit code.

As mentioned earlier, when the system detects a fault, it begins to count the number of times the fault occurs before illuminating the MIL and storing a fault code.

Similarly, if a fault clears, the ECM also records this fact and will turn off the MIL when sufficient no-fault warm-up cycles have taken place. Any fault codes will remain in the ECM memory until the required number of no-fault warm-up cycles have taken place. The number of warm-up cycles required to extinguish the MIL will always be less than the number required to remove a DTC from the ECM memory. DTCs can be removed at any time using the Triumph diagnostic tool.

The system will log the diagnostic trouble codes listed below/over:

Diagnostic Trouble Code (DTC)	Fault Description	Number of no-fault cycles before turning off MIL	Number of no-fault cycles before DTC is erased	MIL illuminated when fault is logged
P0201	Injector 1 circuit malfunction	3	40	Yes
P0202	Injector 2 circuit malfunction	3	40	Yes
P0335	Crankshaft sensor circuit malfunction	3	40	Yes
P0032	Oxygen sensor 1 heater short circuit to battery	3	40	Yes
P0031	Oxygen sensor 1 heater open circuit/short to ground	3	40	Yes
P0130	Oxygen sensor 1 circuit malfunction	3	40	Yes
P0052	Oxygen sensor 2 heater short circuit to battery	3	40	Yes
P0051	Oxygen sensor 2 heater open circuit/short to ground	3	40	Yes
P0150	Oxygen sensor 2 circuit malfunction	3	40	Yes
P1131	Oxygen sensor reverse connection	3	40	Yes
P0122	Throttle position sensor low input	3	40	Yes
P0123	Throttle Position sensor high input	3	40	Yes
P0351	Ignition coil 1 circuit malfunction	3	40	Yes
P0352	Ignition coil 2 circuit malfunction	3	40	Yes
P0107	Manifold absolute pressure sensor 1 low voltage	3	40	Yes
P0108	Manifold absolute pressure sensor 1 high voltage	3	40	Yes
P1105	Manifold absolute pressure sensor 1 pipe malfunction	3	40	Yes
P1687	Manifold absolute pressure sensor 2 low voltage	3	40	Yes
P1688	Manifold absolute pressure sensor 2 high voltage	3	40	Yes
P1106	Manifold absolute pressure sensor 2 pipe malfunction	3	40	Yes
P1111	Manifold absolute pressure sensor reverse connection	3	40	Yes
P1107	Ambient air pressure sensor circuit low voltage	3	40	Yes
P1108	Ambient air pressure sensor circuit high voltage	3	40	Yes
P0112	Intake air temperature too high	3	40	Yes
P0113	Intake air temperature too low	3	40	Yes
P0117	Engine coolant/oil temperature too high	3	40	Yes

Fuel System - Fuel Injected Models

Diagnostic Trouble Code (DTC)	Fault Description	Number of no-fault cycles before turning off MIL	Number of no-fault cycles before DTC is erased	MIL illuminated when fault is logged
P0118	Engine coolant/oil temperature too low	3	40	Yes
P560	Bike voltage system fault	3	40	Yes
P1231	Fuel pump short circuit to ground or open circuit	3	40	Yes
P1232	Fuel pump relay short circuit to battery	3	40	Yes
P0444	Purge valve system short circuit to ground or open circuit	3	40	Yes
P0445	Purge valve system short circuit to battery	3	40	Yes
P0414	Secondary air injection system short circuit to battery	3	40	Yes
P0413	Secondary air injection system short circuit to ground or open circuit	3	40	Yes
P0500	Vehicle speed sensor malfunction	3	40	Yes
P0616	Starter relay coil short to ground or open circuit	3	40	Yes
P0617	Starter relay coil short to battery positive	3	40	Yes
P0654	Tachometer	3	40	Yes
P1685	EMS main relay circuit fault	3	40	Yes
P1659	EMS ignition voltage input circuit fault	3	40	Yes
P1631	Fall detection sensor circuit low voltage	3	40	Yes
P1632	Fall detection sensor circuit high voltage	3	40	Yes
P0560	System voltage - battery circuit malfunction	3	40	Yes
P1610	Fuel level warning light circuit malfunction	3	40	Yes
P0603	EEPROM fault	0	40	No
P1690	CAN communication fault	3	40	Yes
P1696	Voltage control circuit short to ground	3	40	Yes
P1697	Voltage control circuit short to Vbatt	3	40	Yes
P1698	Voltage control circuit malfunction	3	40	Yes
P1605	Tunelock	Only if Tunelock is unlocked		Flashing

Electrical Connectors

Before beginning any diagnosis, the following connector related information should be noted:

Note:

- A major cause of hidden electrical faults can be traced to faulty electrical connectors. For example:
- dirty/corroded terminals
- damp terminals
- broken or bent cable pins within multi-plugs.

For example, the electronic control module (ECM) relies on the supply of accurate information to enable it to plan the correct fuelling and ignition timing. One dirty terminal will cause an excessive voltage drop resulting in an incorrect signal to the ECM.

If, when carrying out fault diagnosis, a fault appears to clear by simply disconnecting and reconnecting an electrical plug, examine each disconnected plug for the following.

Before Disconnection:

- If testing with a voltmeter, the voltage across a connector should be virtually battery volts (unless a resistor is fitted in the circuit). If there is a noticeable change, suspect faulty/dirty connections.

When Disconnecting a Connector:

- Check for a security device that must be released before the connector can be separated. Eg. barb, hook and eye etc.

When Inspecting a Connector:

- Check that the individual pins have not been bent
- Check for dampness/dirt/corrosion
- Check cables for security
- Check cable pin joints for damage.

When Connecting a Connector:

- Ensure there is no dirt around the connector/seal
- Push together squarely to ensure terminals are not bent or incorrectly located
- Push the two halves together positively.

Disconnection of ECM Connectors

Note:

- Two different shaped connectors are used in the ECM, which ensures correct connection is always made.

Caution

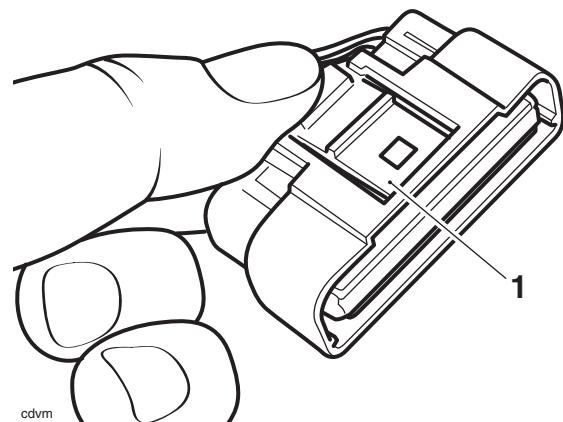
When disconnecting a connector, never pull directly on the wires as this may result in cable and connector damage.

Caution

Never disconnect an ECM when the ignition switch is in the 'ON' position as this may cause multiple fault codes to be logged in the ECM memory.

Always disconnect an ECM after disconnecting the battery negative (black) lead first.

1. Turn the ignition to the 'OFF' position and wait at least 1 minute for the ECM to complete its power down sequence.
2. Press down on the locking device and gently pull back on the connector to release it from the ECM.



1. Locking device

Note:

- The ECM is located behind the battery.

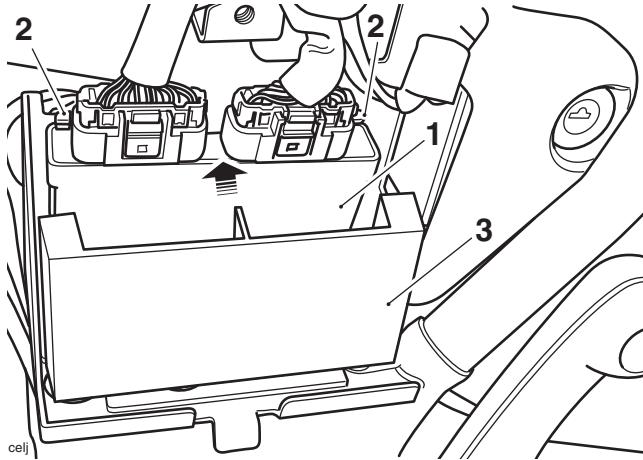
Fuel System - Fuel Injected Models

Reconnection of ECM connectors



Caution

Damage to the connector pins may result if an attempt to fit the connectors incorrectly is made.



1. ECM
2. ECM retaining tangs
3. Rubber cover

3. Fit the connector into its socket and, whilst holding the connector in place, insert it fully into the ECM until the locking device retains it.

Further Diagnosis

The tables that follow will, if used correctly, help to pinpoint a fault in the system once a diagnostic trouble code has been stored.

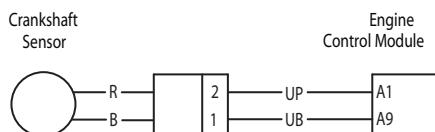
Crankshaft Sensor - Models with Cable Driven Speedometer

Fault Code	Possible cause	Action
P0335	Crankshaft sensor system fault	<p>View & note diagnostic tool 'freeze frame' data if available.</p> <p>Ensure sensor is fitted correctly and connector is secure.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check terminal and cable integrity: - ECM pin A09 - ECM pin A01	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 6
2 Check cable for short circuit: - ECM pin A09 to earth - ECM pin A01 to earth	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 6
3 Check cable continuity: - ECM pin A09 to sensor pin 1 - ECM pin A01 to sensor pin 2	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 6
4 Check cable for short circuit: - ECM pin A09 to ECM pin A1	OK	Renew crankshaft sensor, proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 6
5 Check crank toothed wheel: - Damage to teeth - magnetic debris contamination	OK	Proceed to test 6
	Faulty	Clean/renew toothed wheel, proceed to test 6
6 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

Crankshaft Sensor - Models with Electronic Speedometer

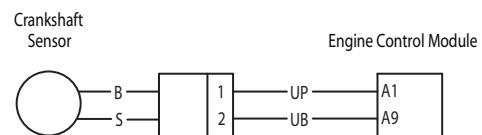
Fault Code	Possible cause	Action
P0335	Crankshaft sensor system fault	<p>View & note diagnostic tool 'freeze frame' data if available.</p> <p>Ensure sensor is fitted correctly and connector is secure.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check terminal and cable integrity: - ECM pin A09 - ECM pin A01	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 6
2 Check cable for short circuit: - ECM pin A09 to earth - ECM pin A01 to earth	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 6
3 Check cable continuity: - ECM pin A09 to sensor pin 2 - ECM pin A01 to sensor pin 1	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 6
4 Check cable for short circuit: - ECM pin A09 to ECM pin A1	OK	Renew crankshaft sensor, proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 6
5 Check crank toothed wheel: - Damage to teeth - magnetic debris contamination	OK	Proceed to test 6
	Faulty	Clean/renew toothed wheel, proceed to test 6
6 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

Fuel Injectors

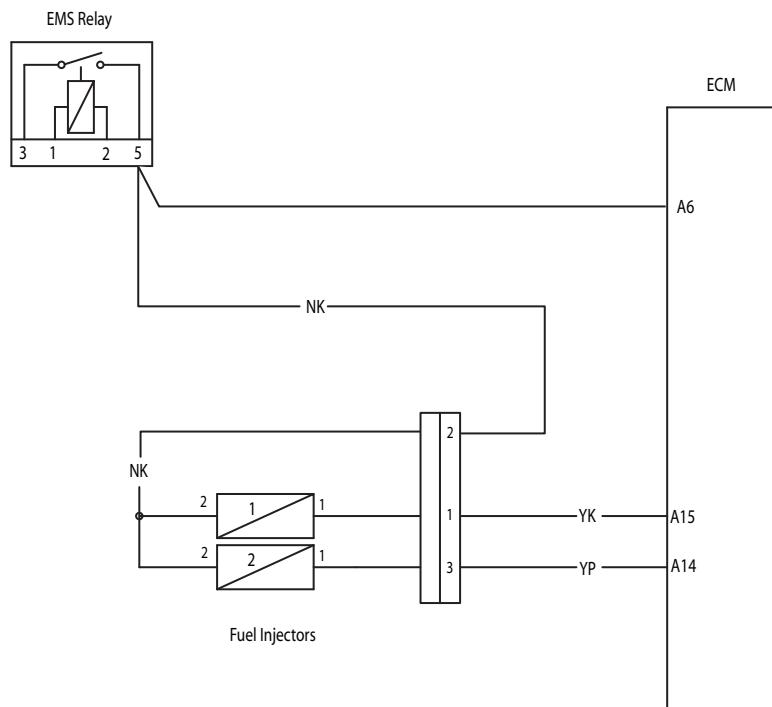
Fault Code	Possible cause	Action
P0201/02	Injection system fault - Injector 1/2 - Misfire indicates open circuit - Flooding indicates short circuit	View & note diagnostic tool 'freeze frame' data if available. Ensure relevant injector connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A15 - ECM pin A14	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin A06 to ECM pin A15 (injector 1) - ECM pin A06 to ECM pin A14 (injector 2)	9.5Ω to 11.5Ω	Proceed to test 3
	Open circuit	Disconnect relevant injector and proceed to test 4
	Short circuit	Disconnect relevant injector and proceed to test 5
3 Check cable for short circuit to ground: - ECM pin A15 to earth - ECM pin A14 to earth	OK	Proceed to test 7
	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity: - ECM pin A6 to relevant injector pin 2 - ECM pin A15 to injector 1 pin 1 - ECM pin A14 to injector 2 pin 1	OK	Proceed to test 6
	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit to supply box: - ECM pin A6 to ECM pin A15 (inj 1) - ECM pin A6 to ECM pin A14 (inj 2)	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check relevant injector resistance: - Injector pin 1 to injector pin 2	9.5Ω to 11.5Ω	Proceed to test 7
	Faulty	Renew relevant injector, proceed to test 7
7 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

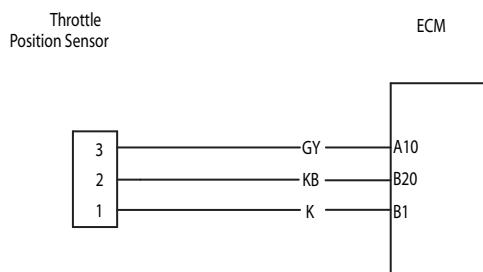
Throttle Position Sensor

Fault Code	Possible cause	Action
P0122 P0123	Throttle position sensor low input voltage (short to ground or open circuit) Throttle position sensor high input voltage (short circuit to sensor supply)	View & note diagnostic tool 'freeze frame' data if available. View & note diagnostic tool 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B01 - ECM pin B20 - ECM pin A10	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin A10 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin A10 to sensor pin 3 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 1	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A10 to ECM pin B01 - ECM pin A10 to ECM pin B20	OK	Renew throttle position sensor, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



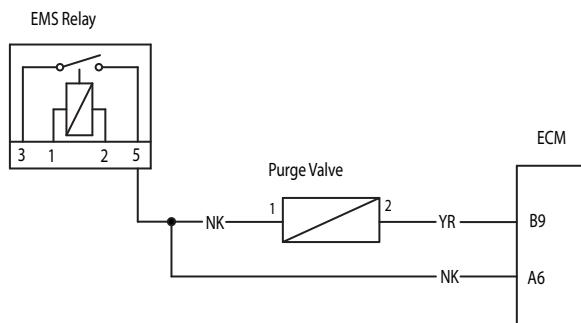
Purge Valve

Fault Code	Possible cause	Action
P0444	Open circuit or short circuit to earth	View & note diagnostic tool 'sensor' data. Ensure purge valve connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0445	Short circuit to battery +	Disconnect purge valve and proceed to pinpoint test 5:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B09	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin A06 to ECM pin B09	22Ω to 30Ω	Disconnect purge valve and proceed to test 3
	Open circuit	Proceed to test 4
	Short circuit	Disconnect purge valve and proceed to test 5
3 Check cable for short circuit: - ECM pin B09 to earth	OK	Proceed to test 7
	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity: - ECM pin B09 to valve pin 2 - ECM pin A06 to valve pin 1	OK	Proceed to test 6
	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit: - ECM pin A06 to ECM pin B09	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check purge valve resistance: - Valve pin 1 to valve pin 2	22Ω to 30Ω	Proceed to test 7
	Faulty	Renew purge valve, proceed to test 7
7 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of purge valve	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

Ignition Coils

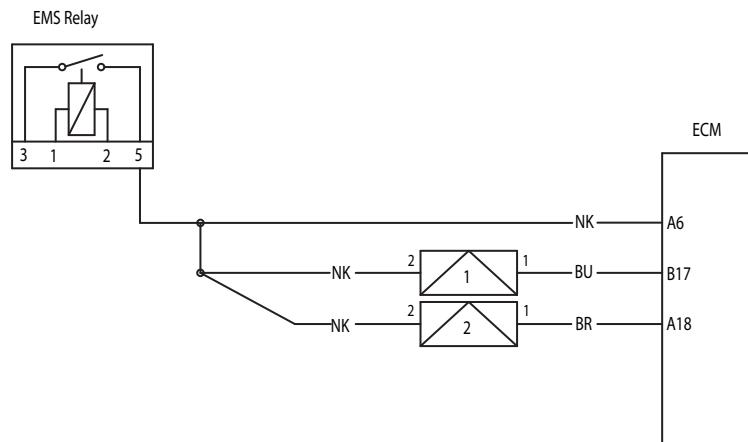
Fault Code	Possible cause	Action
P0351/52	Ignition system fault - lgn coil 1/2	View & note diagnostic tool 'freeze frame' data if available. Ensure relevant ign coil connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B17 - ECM pin A18	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: ECM pin A06 to - ECM pin (ign coil 1) B17 - ECM pin (ign coil 2) A18	1.3Ω to 1.9Ω	Proceed to test 3
	Open circuit	Disconnect relevant ignition coil and proceed to test 4
	Short circuit	Disconnect relevant ignition coil and proceed to test 5
3 Check cable for short circuit: - ECM pin B17 to earth - ECM pin A18 to earth - ECM pin A06 to earth	OK	Proceed to test 7
	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity: ECM Main Relay pin 5 to - lgn coil 1 pin 2 - lgn coil 2 pin 2	OK	Proceed to test 6
	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit: ECM pin A06 to - ECM pin (ign coil 1) B17 - ECM pin (ign coil 2) A18	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check relevant ign coil resistance: - lgn coil pin 1 to ign coil pin 2	1.3Ω to 1.9Ω	Proceed to test 7
	Faulty	Renew relevant ignition coil, proceed to test 7
7 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

Coolant/Oil Temperature Sensor

Fault Code	Possible cause	Action
P0118	Open circuit, or short circuit to battery+	View & note diagnostic tool 'freeze frame' data if available. View & note diagnostic tool 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0117	Short circuit to ground	Disconnect sensor and proceed to test 6:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A29 - ECM pin B20	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin A29 to ECM pin B20 (Temperature dependent - see below)	OK	Disconnect temp sensor and proceed to test 6
	Open circuit	Disconnect sensor and proceed to test 3
	Short circuit	Disconnect temp sensor and proceed to test 4
3 Check cable continuity: - ECM pin A29 to sensor pin 1 - ECM pin B20 to sensor pin 2	OK	Proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable for short circuit: - ECM pin A29 to ECM pin B20	OK	Proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 7
5 Check sensor resistance: - Sensor pin 1 to sensor pin 2 (Temperature dependent - see below)	OK	Proceed to test 7
	Faulty	Renew temp sensor, proceed to test 7
6 Check cable for short circuit: - ECM pin A29 to ground	OK	Proceed to test 7
	Short circuit	Locate and rectify wiring fault, proceed to test 7
7 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Resistance data under typical conditions:

Warm engine: 200 to 400Ω

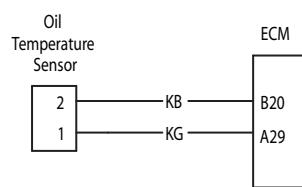
Cold engine:

20°C ambient 2.35 to 2.65KΩ

-10°C ambient 8.50 to 10.25KΩ

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

Inlet Air Temperature Sensor

Fault Code	Possible cause	Action
P0113	Open circuit, or short circuit to battery+	View & note diagnostic tool 'freeze frame' data if available. View & note diagnostic tool 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0112	Short circuit to ground	Disconnect sensor and proceed to pinpoint test 6:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A11 - ECM pin B20	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin A11 to ECM pin B20 (Temperature dependent - see below)	OK	Disconnect temp sensor and proceed to test 6
	Open circuit	Disconnect temp sensor and proceed to test 3
	Short circuit	Disconnect temp sensor and proceed to test 4
3 Check cable continuity: - ECM pin A11 to sensor pin 1 - ECM pin B20 to sensor pin 2	OK	Proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable for short circuit: - ECM pin A11 to ECM pin B20	OK	Proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 7
5 Check sensor resistance: - Sensor pin 1 to sensor pin 2 (Temperature dependent - see below)	OK	Proceed to test 7
	Faulty	Renew temp sensor, proceed to test 7
6 Check cable for short circuit: - ECM pin A11 to ground	OK	Proceed to test 7
	Short circuit	Locate and rectify wiring fault, proceed to test 7
7 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

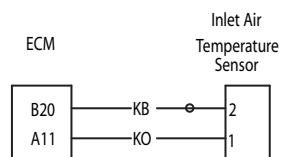
If engine is warm, remove sensor and allow time to cool to ambient prior to test.

Resistance data:

Ambient temp	Resistance value
80°C.....	290 to 390Ω
20°C.....	2.35 to 2.65KΩ
-10°C	8.50 to 10.25KΩ

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

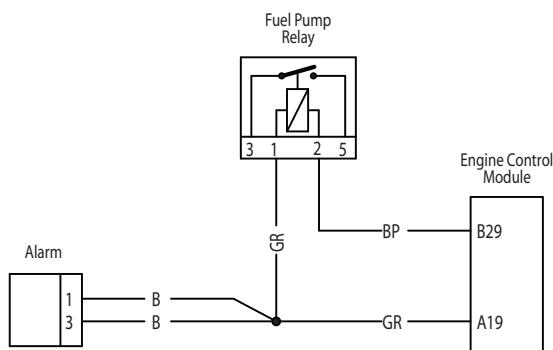
Fuel Pump Relay

Fault Code	Possible cause	Action
P1231	Fuel pump relay open circuit, or short circuit to ground	Check if pump runs briefly when ignition is switched on. Ensure fuel pump relay connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1232	Short circuit to battery+	Disconnect fuel pump relay and proceed to pinpoint test 4:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B29 - Alarm pin 1 - Alarm pin 3	OK	Disconnect fuel pump relay and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin B29 to earth	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin B29 to fuel pump relay pin 2 - Alarm pin 1 or 3 to fuel pump relay pin 1	OK	Renew fuel pump relay, proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin B29 to ECM pin A19	OK	Renew fuel pump relay, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run diagnostic tool function test to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



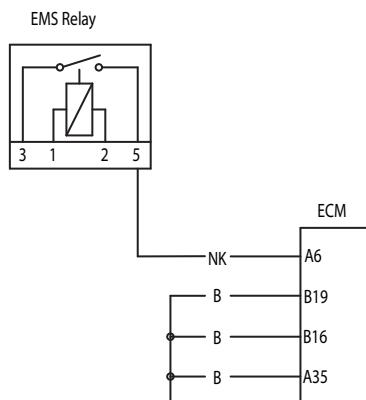
System Voltage

Fault Code	Possible cause	Action
P0560	Bike voltage system fault	<p>View & note diagnostic tool 'sensor' data.</p> <p>Ensure voltage across battery is acceptable, note voltage.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A06	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 3
2 With Ignition 'ON', check voltage at: - ECM pin A06	Same as 'across battery' voltage	Proceed to test 3
	Less than 'across battery' voltage	Locate and rectify wiring fault, proceed to test 3
3 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

Oxygen Sensor

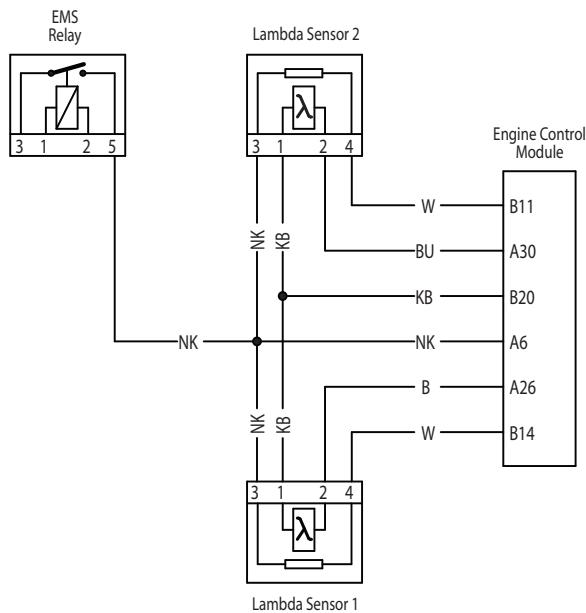
Fault Code	Possible cause	Action
P0130/P0150	Oxygen sensor circuit fault Oxygen sensor 1/2	View & note 'freeze frame' data if available. View & note 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A26 - ECM pin A30 - ECM pin B20	OK	Disconnect oxygen sensors and proceed to test 2
	Faulty	Rectify fault, proceed to test 4
2 Check cable for short circuit: - ECM pin A26 to ground - ECM pin A30 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 4
3 Check cable continuity: - ECM pin A26 to sensor 1, pin 2 - ECM pin A30 to sensor 2, pin 2 - ECM pin B20 to sensor pin 1	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 4
4 check cable for short circuit: - ECM pin B20 to ECM pin A26 (oxygen sensor 1) - ECM pin B20 to ECM pin A30 (oxygen sensor 2) - ECM pin A06 to ECM pin A26 (oxygen sensor 1) - ECM pin A06 to ECM pin A30 (oxygen sensor 2)	OK	Renew relevant oxygen sensor, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine. Check adaptation status	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

Oxygen Sensor Heater

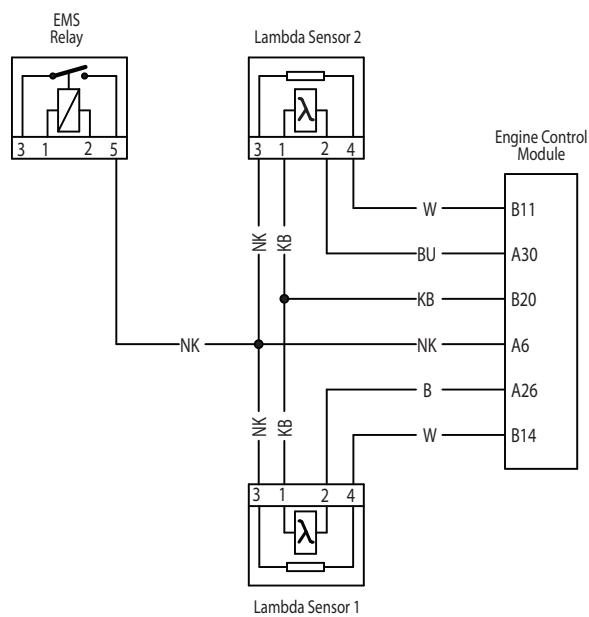
Fault Code	Possible cause	Action
P0031/P0051	Oxygen sensor heater circuit short circuit to ground or open circuit Oxygen sensor 1 and 2	View & note 'freeze frame' data if available. View & note 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0032	Oxygen sensor heater circuit, short circuit to battery Oxygen sensor 1 and 2	Disconnect oxygen sensor and proceed to pinpoint test 4:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B14 - ECM pin B11 - EMS relay pin 5	OK	Disconnect oxygen sensors and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin B14 to earth - ECM pin B11 to earth - ECM pin B14 to ECM pin B20 - ECM pin B11 to ECM pin B20	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin B14 to oxygen sensor 1 pin 4 - ECM pin B11 to oxygen sensor 2 pin 4 - EMS relay pin 5 to relevant oxygen sensor pin 3	OK	Renew relevant oxygen sensor, proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A06 to ECM pin B14 (oxygen sensor 1) - ECM pin A06 to ECM pin B11 (oxygen sensor 2)	OK	Renew relevant oxygen sensor, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine. Check adaption status	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

Oxygen Sensor Reverse Connection

Fault Code	Possible cause	Action
P1131	Oxygen sensor (cylinder 1) connector is plugged into cylinder 2 sensor and vice versa	Check oxygen sensor connections and swap cylinder number 1 and cylinder number 2 connections if incorrect.

EEPROM Error

Fault Code	Possible cause	Action
P0603	EEPROM error	<p>View & note 'freeze frame' data if available.</p> <p>No tests available - contact Triumph service.</p>

Fuel System - Fuel Injected Models

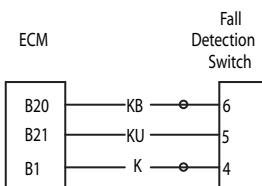
Fall Detection Switch

Fault Code	Possible cause	Action
P1631	Fall detection switch low input voltage	View & note 'freeze frame' data if available.
P1632	Fall detection switch high input voltage or open circuit	View & note 'sensor' data Ensure switch connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B21	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 6
2 Check cable for short circuit: - ECM pin B21 to ground - ECM pin B21 to ECM pin B01 - ECM pin B21 to pin B20	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 6
3 Check cable continuity: - ECM pin B01 to sensor pin 4 - ECM pin B21 to sensor pin 5 - ECM pin B20 to sensor pin 6	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 6
4 Check cable for short circuit: - Sensor pin 4 to sensor pin 5 - Sensor pin 4 to sensor pin 6	OK	Proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 6
5 Check voltage (with ignition on): - Sensor pin 4	5V	Renew fall detection switch and proceed to test 6
	Less than 4.8 V	Locate and rectify wiring fault, proceed to test 6
6 Reconnect harness, clear fault code	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



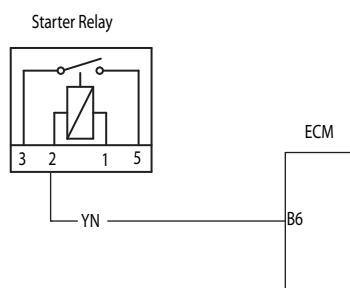
Starter Relay Circuit

Fault Code	Possible cause	Action
P0616	Starter relay coil short to ground or open circuit	Check cable and terminal integrity: - ECM pin B06 - Starter Relay pin 2 Proceed to pinpoint test 1:
P0617	Starter Relay coil short to battery positive	Check cable and terminal integrity: - ECM pin B06 - Starter Relay pin 2 Proceed to pinpoint test 3:

Pinpoint Tests

Test	Result	Action
1 Check cable for short circuit: - ECM pin B06 to ground - Starter relay pin 2 to ground	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 4
2 Check cable for continuity: - ECM pin B06 to Starter relay pin 2	OK	Proceed to test 4
	Faulty (open circuit)	Locate and rectify wiring fault, proceed to test 4
3 Check cable for short circuit: - ECM pin B06 to Battery + - Starter relay pin 2 to Battery +	OK	Renew starter relay and proceed to test 4
	Faulty	Rectify fault, proceed to test 4
4 Reconnect harness, clear fault code and run engine	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

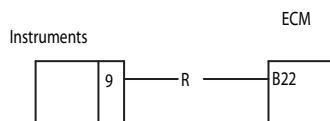
Tachometer - Models with Cable Driven Speedometer

Fault Code	Possible cause	Action
P0654	Tachometer system fault	<p>View & note 'freeze frame' data if available.</p> <p>View & note 'sensor' data.</p> <p>Ensure Instrument connector is secure.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B22	OK	Disconnect instruments and proceed to test 2
	Faulty	Rectify fault, proceed to test 4
2 Check cable for short circuit: - ECM pin B22 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 4
3 Check cable continuity: - Instrument pin 9 to ECM pin B22 - Instrument pin 7 to ground - Instrument pin 8 to alarm control unit pin1	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin B22 to ECM pin A06	OK	Renew instruments, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of tachometer	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



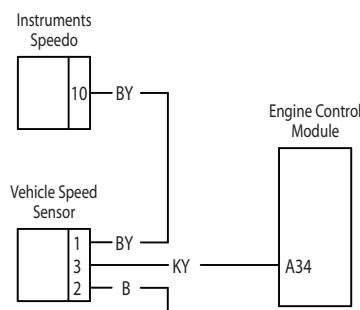
Vehicle Speed Sensor - Models with Electronic Speedometer

Fault Code	Possible cause	Action
P0500	Vehicle speed sensor circuit fault	<p>View & note diagnostic tool 'freeze frame' data if available.</p> <p>Ensure vehicle speed sensor connector is secure.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A34	OK	Disconnect vehicle speed sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin A34 to earth	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - Sensor pin 1 to instrument speedometer pin 10 - Sensor pin 2 to ground - Sensor pin 3 to ECM pin A34	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A34 to instrument speedometer pin 10	OK	Renew vehicle speed sensor, proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

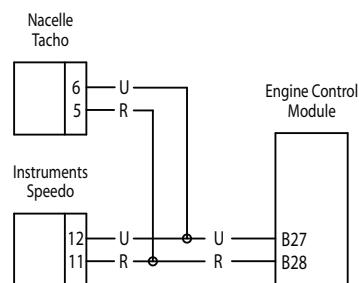
Instrument Communication (CAN) - Models with Electronic Speedometer

Fault Code	Possible cause	Action
P1690	Fault in CAN communication between ECM and instrumentation pack	<p>View & note diagnostic tool 'freeze frame' data if available.</p> <p>Ensure instrument connector is secure.</p> <p>Disconnect ECM and proceed to pinpoint test 1:</p>

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B27 - ECM pin B28 - Instrument speedometer pin 11 - Instrument speedometer pin 12 - Nacelle tachometer pin 5 - Nacelle tachometer pin 6	OK	Disconnect instruments and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin B27 to earth - ECM pin B28 to earth	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin B27 to instrument speedometer pin 12 - ECM pin B27 to nacelle tachometer pin 6 - ECM pin B28 to instrument speedometer pin 11 - ECM pin B28 to nacelle tachometer pin 5	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin B27 to ECM pin B28	OK	Proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



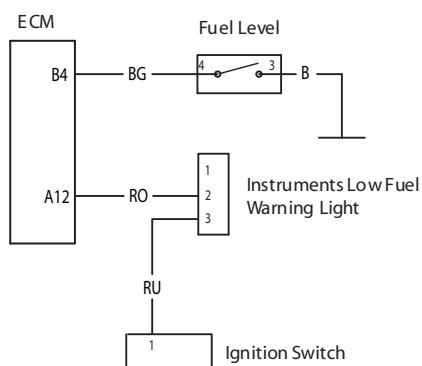
Fuel Level Warning Light Circuit

Fault Code	Possible cause	Action
P1610	Low fuel alarm light fault	Ensure instrument connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B4 - ECM pin A12 - Instrument LED cluster pin 2	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin A12 to ground - ECM pin B4 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin A12 to instrument LED cluster pin 2 - Instrument LED cluster pin 3 to ignition switch pin 1	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check sensor for short circuit: - Sensor pin 3 to sensor pin 4	OK	Renew instruments and proceed to test 5
	Short circuit	Renew fuel level proceed to test 5
5 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of instruments	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

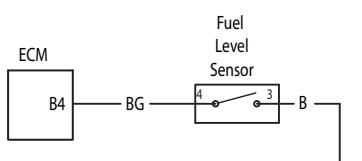
Fuel Level Warning Light Circuit - Models with Electronic Speedometer

Fault Code	Possible cause	Action
P1610	Low fuel alarm light fault	Ensure instrument connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B4	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 4
2 Check cable for short circuit: - ECM pin B4 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 4
3 Check cable continuity: - ECM pin B4 to sensor pin 4 - Sensor pin 3 to ground	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of instruments	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



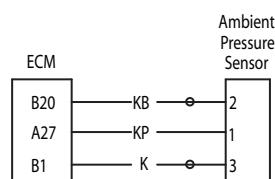
Ambient Pressure Sensor

Fault Code	Possible cause	Action
P1107	Ambient pressure sensor circuit short circuit to ground	View & note 'freeze frame' data if available. View & note 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1108	Ambient pressure sensor circuit, short circuit to supply or open circuit	Disconnect ambient pressure sensor and proceed to pinpoint test 4:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A27 - ECM pin B20 - ECM pin B01	OK	Disconnect ambient pressure sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin A27 to ECM B20	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable for continuity: - ECM pin A27 to sensor pin 1 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 3	OK	Renew ambient pressure sensor and proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A27 to ECM pin B01	OK	Renew ambient pressure sensor and proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

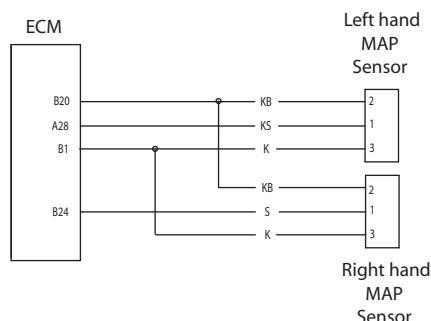
Manifold Absolute Pressure (MAP) Sensor (cylinder number 1)

Fault Code	Possible cause	Action
P0107	MAP sensor circuit short circuit to ground	View & note 'freeze frame' data if available. View & note 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0108	MAP sensor circuit, short circuit to supply or open circuit	Disconnect MAP sensor and proceed to test 4:
P1105	MAP sensor pipe fault	Check connection/condition of pipe from MAP sensor to throttle body and proceed to pinpoint test 5:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A28 - ECM pin B20 - ECM pin B01	OK	Disconnect MAP sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin A28 to ECM B20	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable for continuity: - ECM pin A28 to sensor pin 1 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 3	OK	Renew MAP sensor and proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A28 to ECM pin B01	OK	Renew MAP sensor and proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



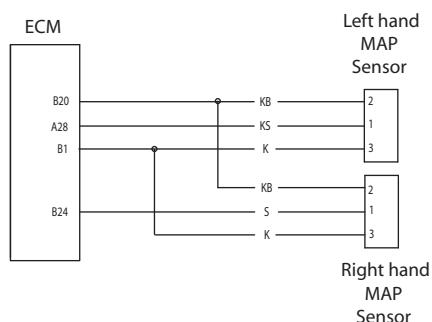
Manifold Absolute Pressure (MAP) Sensor (cylinder number 2)

Fault Code	Possible cause	Action
P1687	MAP sensor circuit short circuit to ground	View & note 'freeze frame' data if available. View & note 'sensor' data. Ensure sensor connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1688	MAP sensor circuit, short circuit to supply or open circuit	Disconnect MAP sensor and proceed to test 4:
P1106	MAP sensor pipe fault	Check connection/condition of pipe from MAP sensor to throttle body and proceed to pinpoint test 5:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B24 - ECM pin B20 - ECM pin B01	OK	Disconnect MAP sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin B24 to ECM B20	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable for continuity: - ECM pin B24 to sensor pin 1 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 3	OK	Renew MAP sensor and proceed to test 5
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin B24 to ECM pin B01	OK	Renew MAP sensor and proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine	OK	Action complete, quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

Manifold Absolute pressure (MAP) Sensor Reverse Connection

Fault Code	Possible cause	Action
P1111	MAP sensor pipes connected incorrectly; i.e, left hand sensor connected to right hand pipe and vice versa	Check MAP sensor pipes and swap left hand and right hand pipes around.

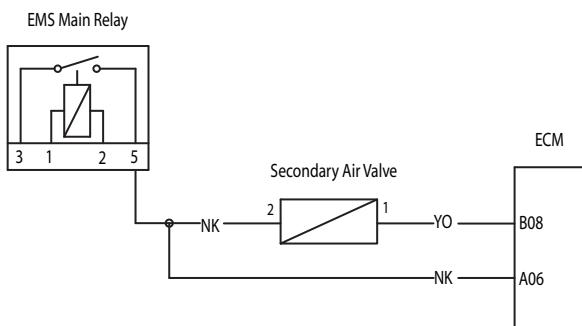
Secondary Air Injection Valve

Fault Code	Possible cause	Action
P00413	Open circuit or short circuit to earth	View & note diagnostic tool 'sensor' data. Ensure SAI valve connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P0414	Short circuit to battery positive	Disconnect SAI valve and proceed to pinpoint test 5:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin A06	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin B08 to ECM pin A06	18Ω to 25Ω	Disconnect SAI valve and proceed to test 3
	Open circuit	Proceed to test 4
	Short circuit	Disconnect SAI valve and proceed to test 5
3 Check cable for short circuit: - ECM pin B08 to ground	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity: - ECM pin B08 to valve pin 1 - ECM pin A06 to valve pin 2	OK	Proceed to test 6
	Open Circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit: - ECM pin B08 to ECM pin A06	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check SAI valve resistance: - Valve pin 1 to Valve pin 2	18Ω to 25Ω	Proceed to test 7
	Faulty	Renew SAI valve, proceed to test 7
7 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of SAI valve	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

EMS Main Relay Circuit

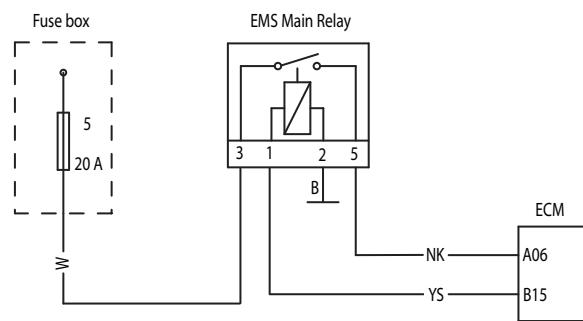
Fault Code	Possible cause	Action
P1685	EMS Main Relay circuit fault	Note that the Starter Motor cannot be powered if a Main Relay fault exists. Ensure the EMS Main Relay connector is secure. Proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Ensure ignition has been switched off for greater than one minute. Identify EMS Main Relay on the harness. Check that relay operates when the ignition is switched 'ON'.	OK	Proceed to test 2
	Faulty	Disconnect ECM and proceed to test 4
2 Check fuse box Fuse 5 integrity	OK	Disconnect ECM and proceed to test 4
	Faulty	Disconnect ECM and proceed to test 3
3 Check cable for short circuit: - ECM pin A06 to ground - EMS Main relay pin 3 to ground	OK	Replace Fuse 5 and proceed to test 4
	Short circuit	Locate and rectify wiring fault, replace Fuse 5 and proceed to test 7
4 Check cable and terminal integrity: - ECM pin A06 - ECM pin B15 - EMS Main Relay pin 1 - EMS Main Relay pin 2 - EMS Main Relay pin 3 - EMS Main Relay pin 5	OK	Disconnect Main Relay and proceed to test 5
	Faulty	Rectify fault, proceed to test 7
5 Check cable for short circuit: - ECM pin B15 to ground	OK	Proceed to test 6
	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check cable continuity: - ECM pin A06 to EMS Relay pin 5 - ECM pin B15 to Relay pin 1 - EMS Main Relay pin 2 to ground - EMS Main Relay pin 3 to Fuse box Fuse 5	OK	Replace EMS Main Relay and proceed to test 7
	Open circuit	Locate and rectify wiring fault, proceed to test 7
7 Reconnect harness, clear fault code. Switch ignition off for longer than one minute. Switch ignition on and check that the EMS main relay operates. Start engine as final check	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Fuel System - Fuel Injected Models

Circuit Diagram



Fuel System - Fuel Injected Models

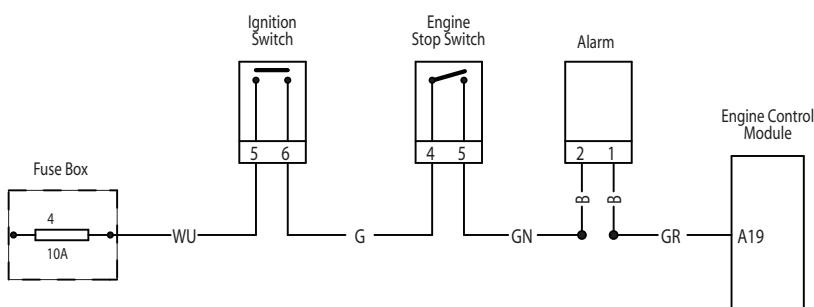
EMS Ignition Voltage Input Circuit

Fault Code	Possible cause	Action
P1659	EMS Ignition Voltage input circuit fault	Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check Fuse box Fuse 4 integrity	OK	Proceed to test 3
	Faulty	Proceed to test 2
2 Check cable for short circuit: - ECM pin A19 to ground	OK	Replace Fuse 4 and proceed to test 3
	Short circuit	Locate and rectify wiring fault, replace Fuse 4 and proceed to test 5
3 Check cable and terminal integrity: - ECM pin A19 - Alarm Connector pin 1 - Alarm Connector pin 2 - Right hand switchcube pin 4 - Right hand switchcube pin 5 - Ignition Switch pin 5 - ignition Switch pin 6	OK	Proceed to test 4
	Faulty	Rectify fault, proceed to test 5
4 Check cable continuity: - ECM pin A19 to right hand switch cube pin 6, note that the engine stop switch must be in the 'RUN' position and any Alarm fitted must be disarmed	OK	Proceed to test 5
	Open circuit	Locate and rectify wiring, immobiliser or engine stop switch fault, proceed to test 5
5 Reconnect harness, clear fault code and run engine to verify fault cleared	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



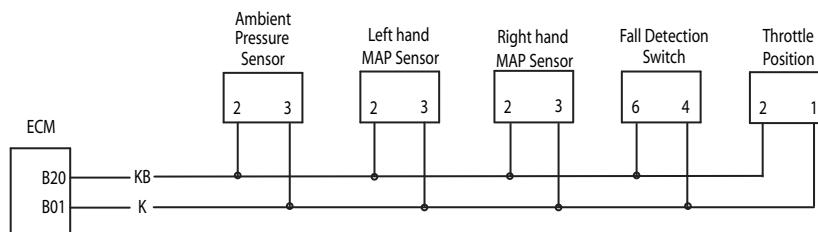
5 Volt Sensor Supply Circuit

Fault Code	Possible cause	Action
P1696/P1697/P1698	Sensor supply circuit shorted Sensor supply circuit shorted to ground Sensor supply circuit shorted to battery positive	View & note 'sensor' data. Note ECM sensors requiring a power supply will not be active. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B01 - ECM pin B20	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit - ECM pin B01 to ECM pin B20	OK	Proceed to test 4
	Faulty	Proceed to test 3
3 Disconnect the following sensors in turn: - MAP sensor - Ambient pressure sensor - Throttle position switch - Fall detection sensor Retest for short circuit - ECM pin B01 to ECM pin B20	OK	Replace sensor last removed and proceed to test 5
	Faulty	Proceed to test 4
4 Check cable for short circuit: - ECM pin B01 to ground - ECM pin B20 to ground - ECM pin B01 to A06 - ECM pin B20 to A06 - ECM pin B01 to battery positive - ECM pin B20 to battery positive	OK	Proceed to test 5
	Short circuit	Locate and rectify wiring fault, proceed to test 5
7 Reconnect harness, clear fault code and use service tool to check for correct sensor outputs and 5 V sensor supply voltage level	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Fuel System - Fuel Injected Models

Tune Lock

Fault Code	Possible cause	Action
P1605	ECM is locked to prevent the motorcycle from being operated	This is also identified by a fast flashing MIL indication, and a disabled engine management system. Unlock the ECM using the service tool and supplied unlock code from Triumph service.

Fault Finding - Non Electrical

Symptom	Possible cause(s)
Poor throttle response at low RPM	Low fuel pressure caused by filter blockage/leaks
Cutting out at idle	Throttle bodies out of balance
	Low fuel pressure
	Weak mixture caused by air leak at the throttle body/transition piece to cylinder head face
Idle speed too low/high	Incorrect closed throttle position setting
	Mechanical fault with the throttle linkage
Diagnostic tool malfunctions during tune download procedure	Low battery voltage
Throttle hang-up	Incorrect closed throttle position setting
Bike will start but cuts out immediately	Low fuel pressure caused by filter blockage/leaks
Abnormally high fuel pressure	Fuel pressure regulator inoperative

Fuel System - Fuel Injected Models

Fuel Tank



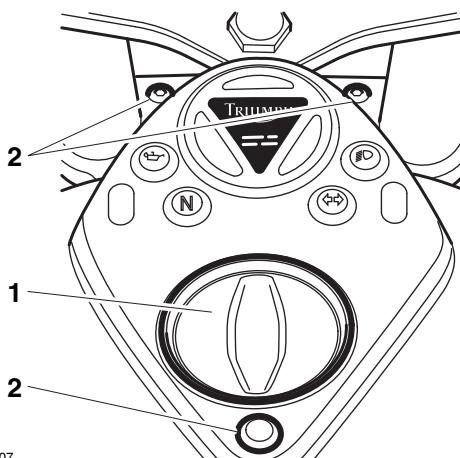
Warning

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 console and disconnect the warning light and tachometer (if fitted) sub-harness from the main wiring harness then place the warning light console to one side.

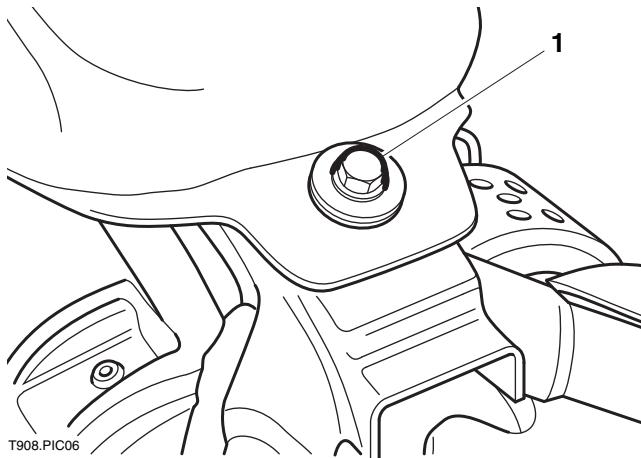


T908.PIC07

1. Warning light panel

2. Screw locations

4. Slacken and remove the mounting bolt from the rear of the fuel tank.



1. Fuel tank mounting bolt

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. Raise the fuel tank and disconnect the electrical connection to the fuel pump and low fuel level sensor.

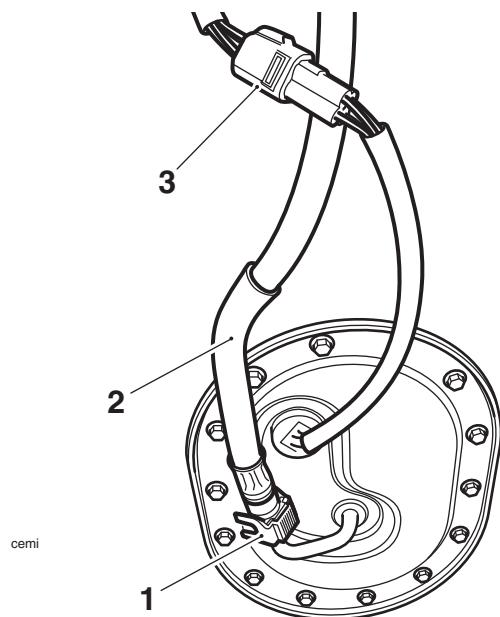


Warning

When disconnected, the fuel tank is self-sealing but a small amount of fuel may escape causing clothing and components to be coated with fuel.

This would represent a serious fire hazard which could lead to burn injuries and damage to property.

7. Release the security clip from the fuel hose by sliding it outwards from the connector.
8. Disconnect the fuel hose by squeezing the sides of the connector and pulling the hose free from its spigot on the fuel pump plate.



1. Security clip

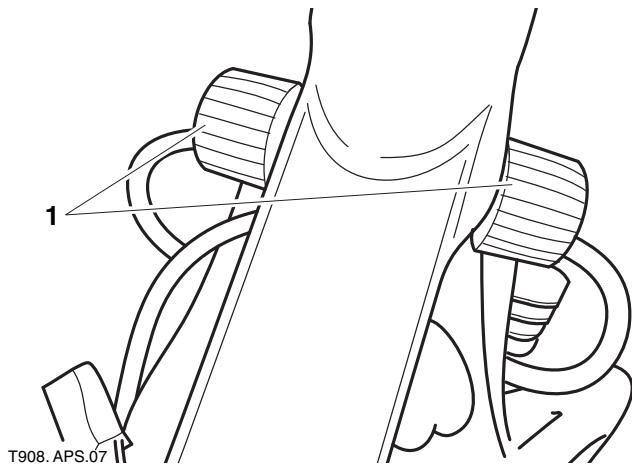
2. Fuel hose

3. Fuel pump & low fuel level sensor electrical connection

9. 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. Reconnect the fuel feed hose by gently pushing inwards until the hose engages with a click.
4. Reconnect the fuel pump and low fuel level sensor electrical connector and the breather hose. On California models connect the evaporative loss system hose.
5. Fit the collar and bolt to the rear mounting rubber, tightening it to **19 Nm**.
6. Align the warning light console to the tank and reconnect the wiring.
7. Refit the screws and tighten them to **3 Nm**.
8. Reconnect the battery, positive (red) lead first.
9. Start the engine and check carefully for fuel leaks.

Fuel Pump, Fuel Filter and Fuel Level Sender

Removal

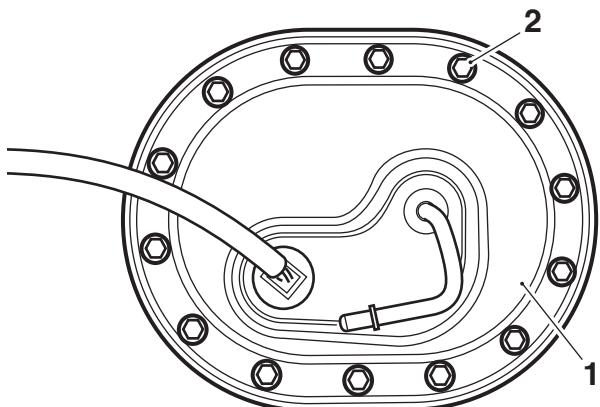
1. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page 10B-76).
4. Drain the fuel tank into a suitable container.



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.

5. Invert the fuel tank and place on a protective surface to prevent paint damage.
6. Remove the fixings securing the fuel pump mounting plate to the tank.



cemj

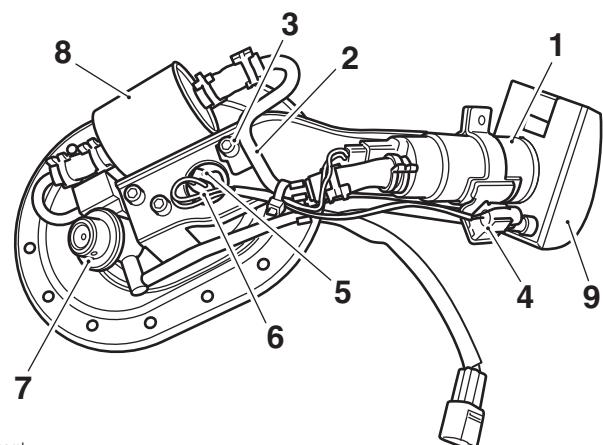
1. Mounting plate

2. Mounting plate fixings

7. Lift the fuel pump assembly and manoeuvre it from the tank aperture.
8. Remove the seal from the tank aperture.

Fuel System - Fuel Injected Models

Disassembly



1. Fuel pump

2. Fuel pipe

3. Fuel pipe fixing

4. Fuel low level sender

5. Fuel pump connection

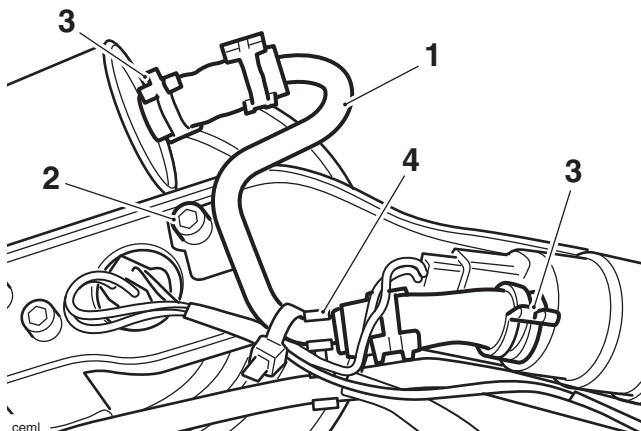
6. Fuel low level sender connection

7. Fuel pressure regulator

8. Fuel filter

9. Fuel pump baffle

1. Disconnect the electrical connections to the fuel pump and low fuel level sensor.
2. Remove the fixing from the fuel pipe bracket.
3. Release the hose clips from the pump and filter after first noting their positions.
4. Cut and discard the cable tie securing the fuel pump and low fuel level sensor wiring to the fuel pipe. Detach the fuel pump baffle hose clip.
5. Remove the fuel pipe together with the hoses leading from the pump and to the filter.



1. Fuel pipe

2. Fuel pipe fixing

3. Hose clips

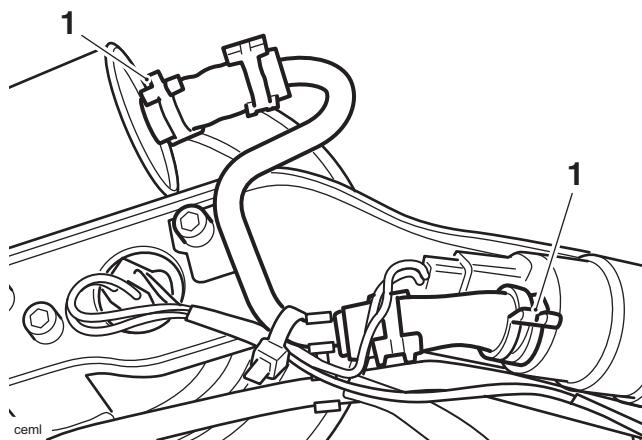
4. Fuel pump baffle hose clip

6. To remove the fuel pump, detach the fuel pump baffle hose from the fuel pressure regulator. Remove the fixing from the pump clamp, release the clamp and collect the fuel pump.
7. If necessary, remove the fuel pump baffle and filter from the fuel pump by loosening the hose clip and sliding the baffle assembly clear of the pump.
8. To remove the fuel filter, release the clip after noting its position, then detach it from the upper part of its hose leading to the fuel pressure regulator.
9. To detach the low fuel level sender, release the clip securing it to the fuel pump bracket after noting its orientation.
10. To remove the fuel pressure regulator, detach the fuel pump baffle hose, release the fixing and remove the regulator. Remove and discard the O-ring.

Assembly

1. Fit a new O-ring to the fuel pressure regulator and refit the regulator to the fuel pump plate. Install the fixing and tighten to **4 Nm**.
2. Position the fuel filter to the hose leading to the pressure regulator. Ensure the filter is fitted with the arrow on its side pointing towards the fuel pressure regulator.
3. Locate the fuel pump to its bracket.
4. Refit the fuel pump clamp then fit and tighten the fixing to **4 Nm**. Connect the fuel pump baffle hose and secure with the clip.
5. Position the fuel pipe and hoses to the fuel pump and filter. Fully locate both hoses.
6. Secure the fuel pipe bracket with a new fixing, tightening it to **10 Nm**.
7. Secure the fuel pump baffle hose to the clip on the fuel pipe.

- Position the hose clips to ensure that both hoses are correctly retained.



- Hose clips (correctly positioned)**

- Connect both electrical connections to the fuel pump mounting plate.

Installation

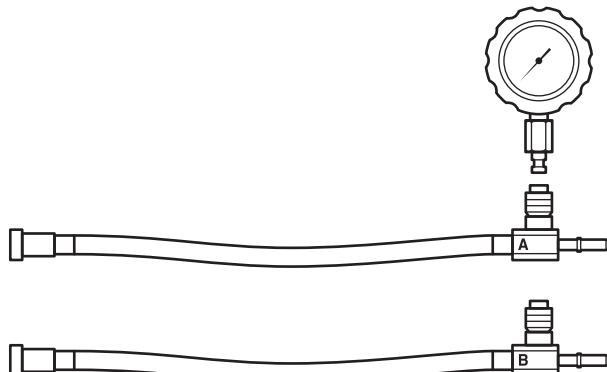
- Inspect the fuel pump plate seal for damage, and renew if necessary.
- Reposition the fuel pump plate seal to the tank aperture and ensure that it is correctly seated.
- Taking care to ensure the fuel pump plate seal is not damaged or dislodged, manoeuvre the fuel pump assembly into the tank aperture.
- Tighten the mounting plate fixings to **5 Nm**.
- Refit the fuel tank (see page *10B-77*).
- Reconnect the battery, positive (red) lead first.
- Refit the seats (see page *16-16*).

Fuel Pressure Checking

Warning

Observe the fuel handling precautions given in the general information system.

Fuel pressure is checked using service tool T3880001.



Tool T3880001

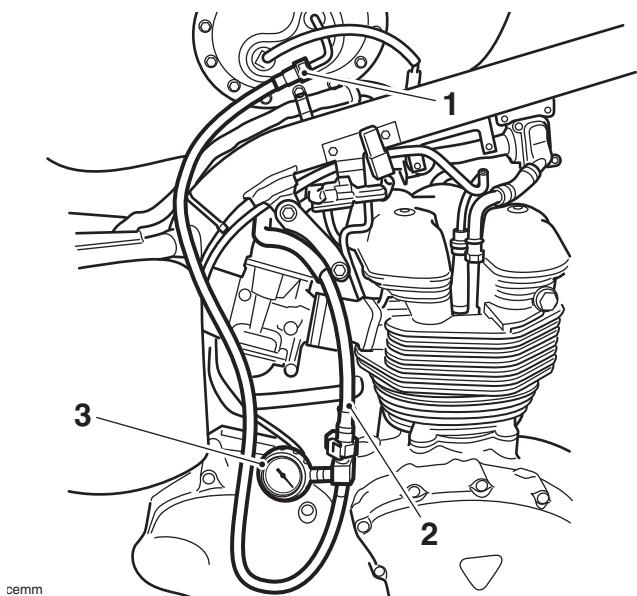
- Release the fuel tank to gain access to the fuel pipe connections (see page *10B-76*).
- With the aid of an assistant, support the fuel tank and disconnect the fuel pipe from the fuel pump plate.
- Select the fuel pressure gauge adapter marked 'B' from service tool T3880001.

Warning

Always use the correct fuel pressure gauge adapter (**Adapter 'B' for EFI Speedmaster, America and America LT models**). Use of an incorrect adapter will result in a fuel leak. A fuel leak can result in a fire causing damage to property and injury to persons.

Fuel System - Fuel Injected Models

4. Connect the adapter between the fuel pump plate outlet and fuel hose as shown in the illustration below. Insert the gauge to the adapter also as shown in the illustration.



- demm
1. Fuel pump plate outlet
 2. Fuel hose
 3. Tool T3880001

Note:

- To release the fuel pressure gauge from the adapter, slide the outer ferrule downwards. This will allow the gauge to spring upwards from the adapter.
 - To insert the gauge to the adapter, push the gauge spigot into the adapter until a click can be heard.
5. Ensuring the gauge is visible to the side of the motorcycle, lower the fuel tank into position.
 6. Start the engine and observe the fuel pressure reading on the gauge.

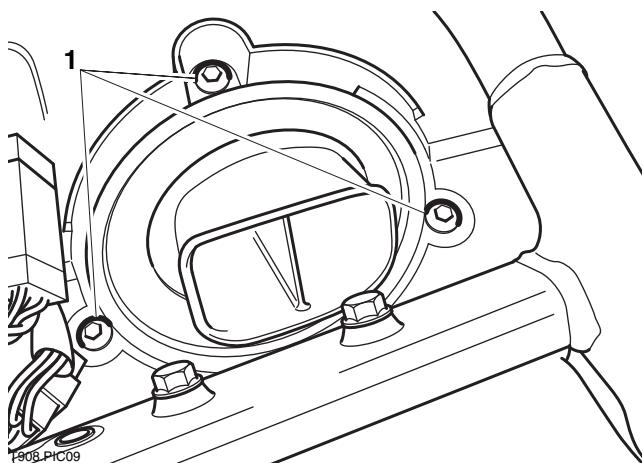
Note:

- The fuel pressure should be 3.0 bar nominally.
7. When fuel pressure checking is complete, have an assistant raise the fuel tank and disconnect the fuel pressure gauge adapter.
 8. Reconnect the fuel hose and refit the fuel tank (see page 10B-77).

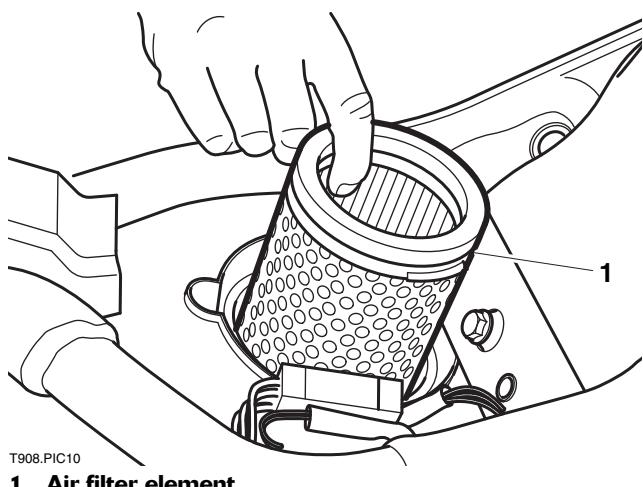
Air Filter Element

Removal

1. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
2. Remove the cable cover (without removing the barometric pressure sensor) from the top of the airbox and position aside.
3. Detach the diagnostic connection from the airbox cover.
4. Undo the three screws and remove the filter cover from the airbox.



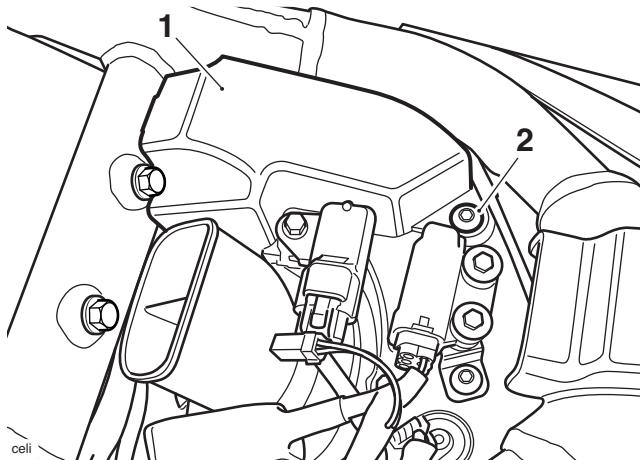
- T908.PIC09
1. Air filter cover screws
 5. Remove the air filter element from the airbox.



- T908.PIC10
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. Secure the diagnostic connector to the tang on the airbox cover.
4. Refit the airbox cable cover, ensuring the lip of the cover locates in the slot in the frame.



1. Airbox

2. Cable cover

5. Tighten the fixing to **3 Nm**, while ensuring the cables are tidily placed beneath the cover.
6. Refit the seats (see page 16-16).

Airbox

Removal

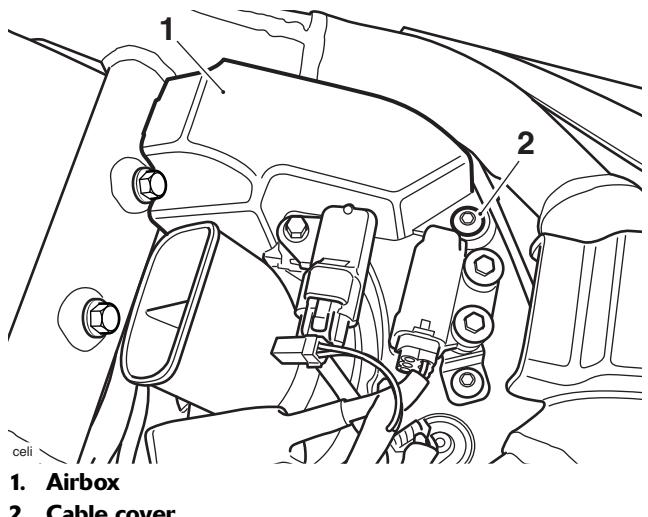
1. Raise the motorcycle and support the frame such that the rear wheel is clear of the ground.



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 seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
4. **America LT only:** Remove the following:
 - Panniers (see page 16-24).
 - Pannier mountings and passenger backrest (see page 16-25).
5. Detach the diagnostic connector from the airbox cover.
6. Remove the intake air temperature sensor (see page 10B-86).
7. Remove the fall detection switch (see page 10B-87).
8. Remove the cable cover (without removing the barometric pressure sensor) from the top of the airbox and position aside.

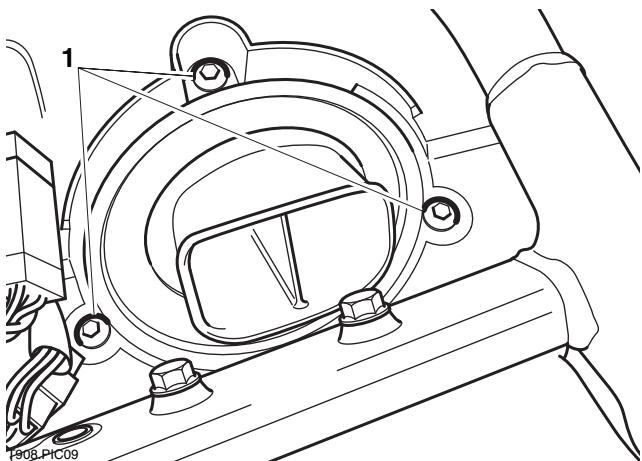


1. Airbox

2. Cable cover

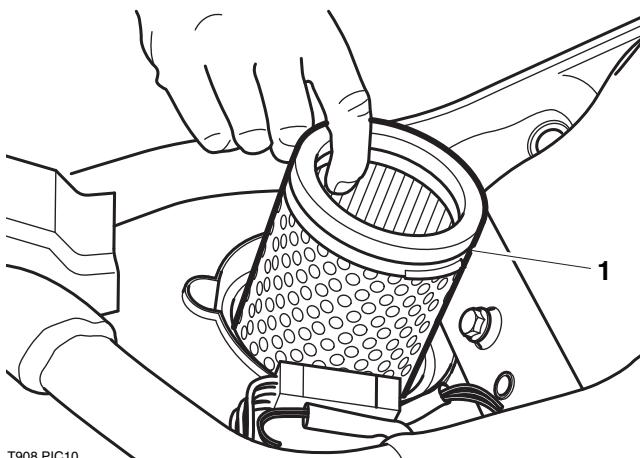
Fuel System - Fuel Injected Models

9. Undo the three screws and remove the filter cover from the airbox.



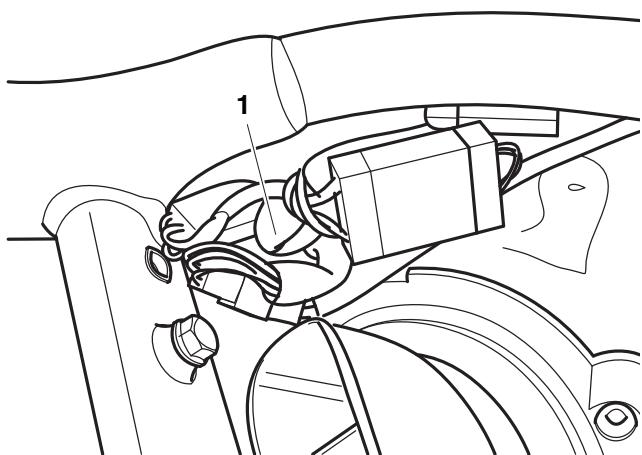
1. Air filter cover screws

10. Remove the air filter element from the airbox.



1. Air filter element

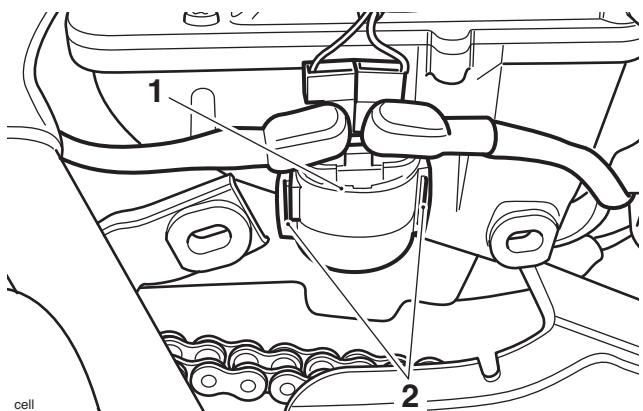
11. Disconnect the rear light wiring connector.



1. Rear light connector location

12. Remove the rear wheel (see page 15-22).
13. Remove the rear mudguard (see page 16-18).
14. Remove the right hand side cover (see page 16-17).

15. **For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Detach the starter solenoid from the airbox tangs.

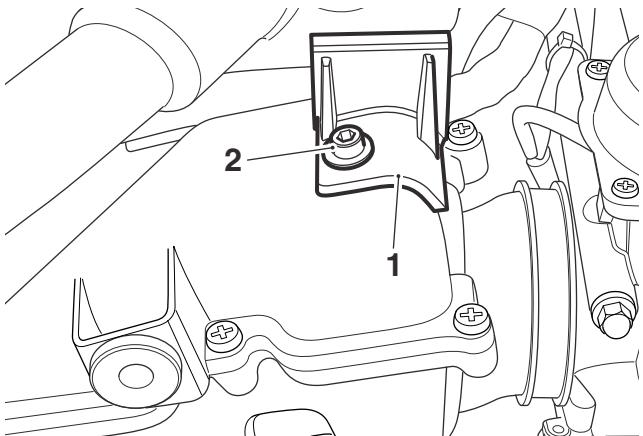


1. Starter solenoid

2. Airbox tangs

16. Remove the right hand airbox cover.

17. Remove the bracket for the right hand airbox cover.



1. Bracket

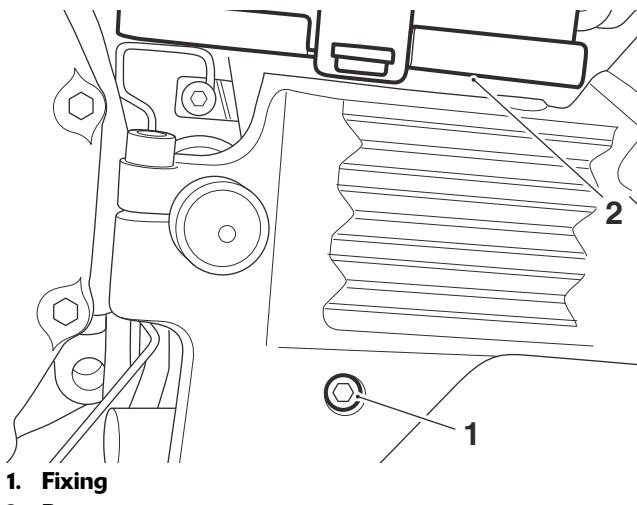
2. Fixing

18. Remove the fuse/ignition switch cover.

19. **For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Detach the engine control module (ECM) along with its rubber cover.

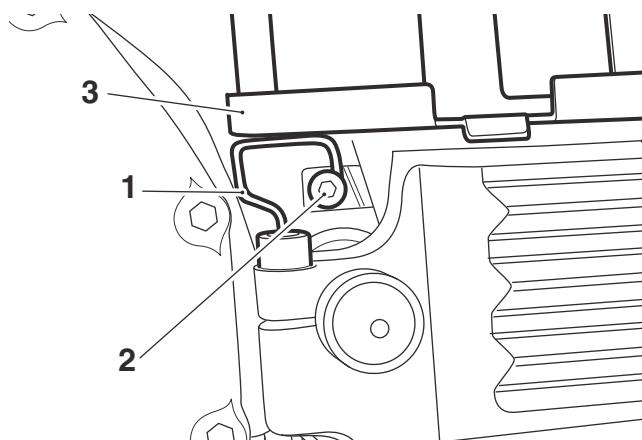
Fuel System - Fuel Injected Models

20. Remove the lower fixing for the battery tray.



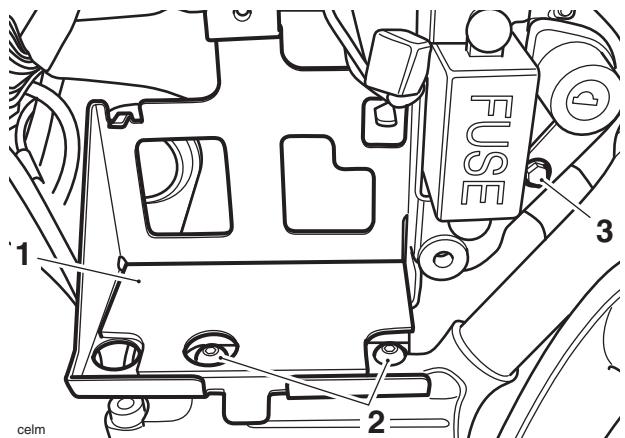
- 1. Fixing
2. Battery tray**

21. Detach the wire guide from the underside of the battery tray.



- 1. Wire guide
2. Fixing
3. Battery tray**

22. Remove the two M8 screws and the M6 screw, shown below, and detach the battery box and position aside. It is not necessary to remove the battery box completely.

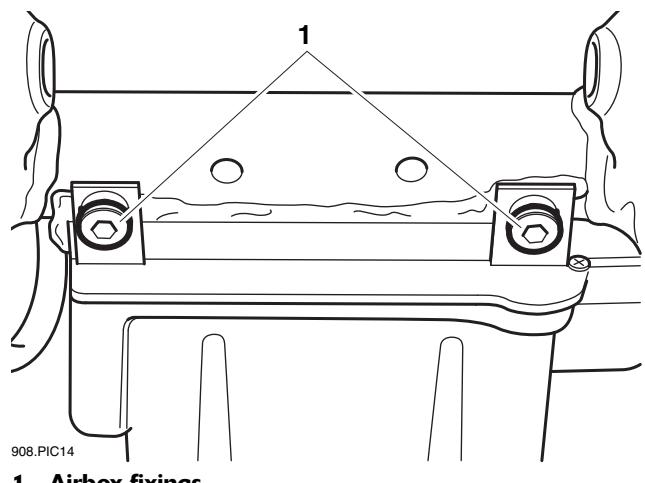


- 1. Battery box
2. M8 screws
3. M6 screw**

23. Support the swinging arm, then remove both Rear suspension units as described in the Rear Suspension section.

24. Make a note of the location and routing of all airbox hoses and electrical harnesses to ensure they are refitted in the same positions.

25. Release the fixings securing the airbox to the frame.

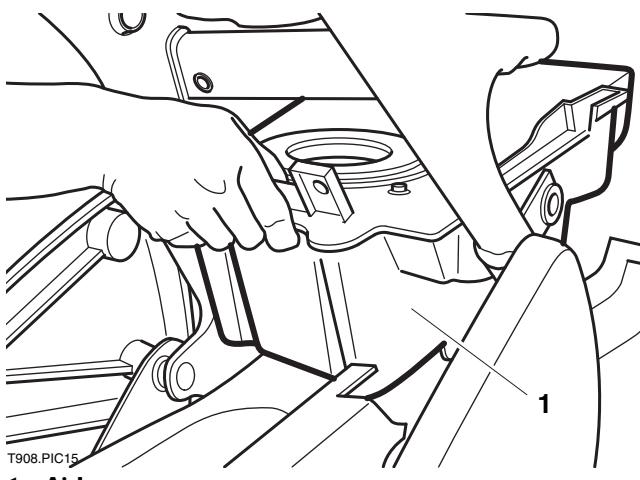


- 1. Airbox fixings**

26. Release the clips securing the airbox to the throttle bodies.

Fuel System - Fuel Injected Models

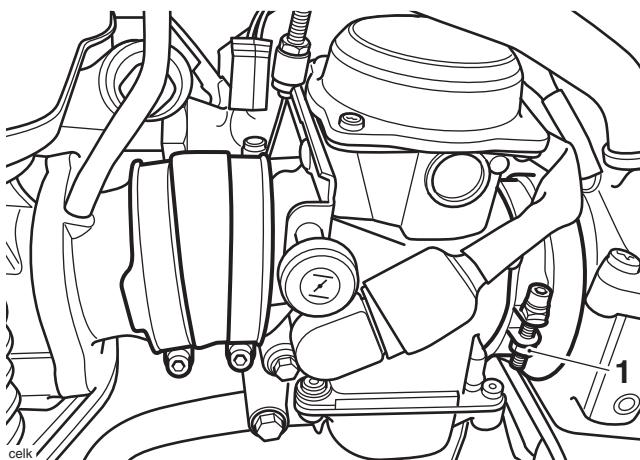
27. Remove the airbox in a rearward direction adjusting its position to enable it to clear any obstacles.



1. Airbox

Installation

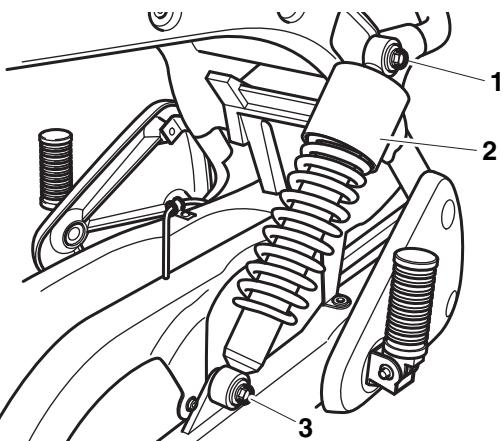
- Locate the airbox to the frame and position it to the throttle bodies and fixing points. Ensure that the airbox rubbers correctly engage with the rear of the throttle bodies through 360° of BOTH rubbers.
- Tighten the clips securing the airbox to the throttle bodies to **1.5 Nm**.



1. Throttle body rubber

- Insert the airbox fixings, tightening to **9 Nm**.
- Refit and correctly route the airbox hoses as noted during strip-down.
- Apply ThreeBond 1305 or equivalent to the threads of the rear suspension unit fixings.

- Support the swinging arm then refit both rear suspension units. Tighten the upper and lower fixings to **28 Nm**.

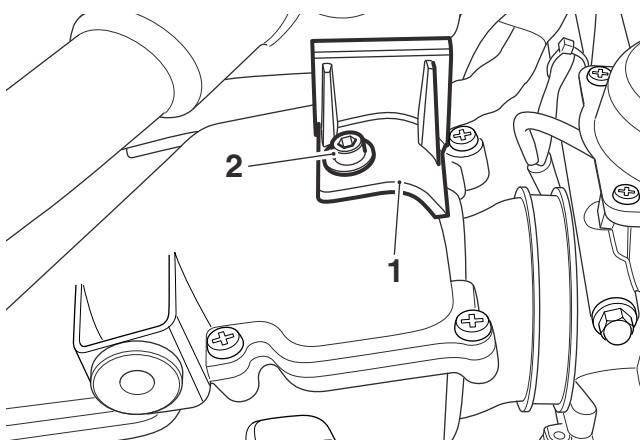


1. Upper mounting bolts

2. Rear suspension unit

3. Lower mounting bolts

- Refit the rear mudguard (see page 16-19).
- Refit the bracket for the right hand airbox cover and tighten the fixing to **3 Nm**.



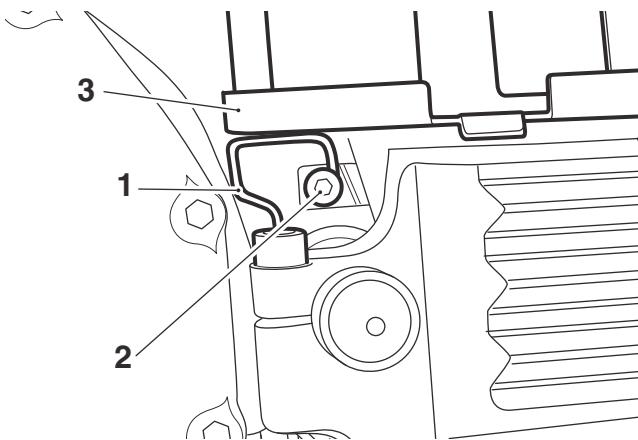
1. Bracket

2. Fixing

- Refit the right hand airbox cover and tighten the fixing to **3 Nm**.
- For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Attach the starter solenoid to the airbox tangs and refit the right hand side panel.
- Reposition the battery box and refit the three fixings. Tighten the M8 screw to **10 Nm**, and the M6 screw to **18 Nm**.
- Refit the lower fixing for the battery tray and tighten to **20 Nm**.

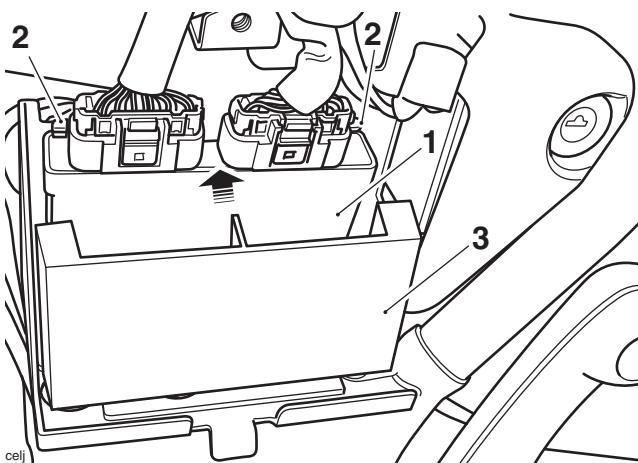
Fuel System - Fuel Injected Models

13. Attach the wire guide to the underside of the battery tray and tighten the fixing to **10 Nm**.



1. Wire guide
2. Fixing
3. Battery tray

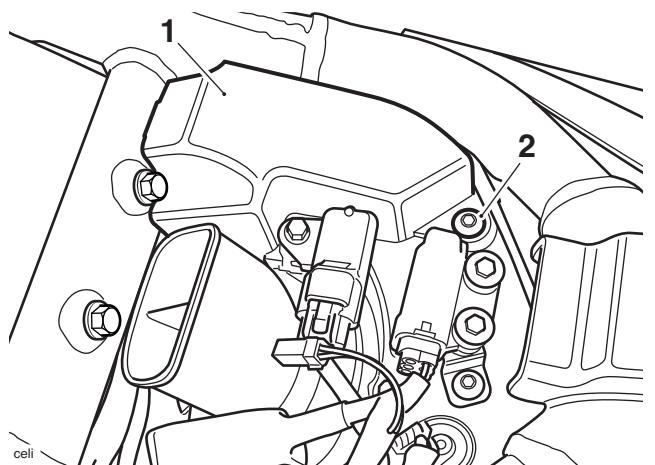
14. Refit the fuse/ignition switch cover.
 15. **For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Refit the ECM and its rubber cover, ensuring the ECM is located under the two tangs on the battery box.



1. Engine control module (ECM)
2. Tangs
3. Rubber cover

16. Refit the rear wheel (see page 15-23).
 17. Reconnect the rear light.
 18. Refit the air filter element into the airbox, taking care not to damage the painted surface of the frame.
 19. Refit the cover to the airbox and tighten its screws to **3 Nm**.
 20. Refit the airbox cable cover, ensuring the lip of the cover locates in the slot in the frame.

21. Tighten the fixing to **3 Nm**, while ensuring the cables are tidily placed beneath the cover.



1. Airbox
 2. Cable cover
22. Refit the fall detection switch (see page 10B-87).
 23. Refit the intake air temperature sensor (see page 10B-86).
 24. Attach the diagnostic connector to the airbox cover.
 25. Install and reconnect the battery, positive (red) lead first, ensuring the ECM and its rubber cover are located as noted during removal.
 26. **America LT only:** Refit the following:
 - Pannier mountings and passenger backrest (see page 16-25).
 - Panniers (see page 16-24).
 27. Refit the seat(s) (see page 16-16).
 28. Switch on the ignition and test the rear light, rear indicators, number plate and brake lights for correct function. Rectify if necessary.
 29. Lower the motorcycle to the ground and park on the side stand.

Fuel System - Fuel Injected Models

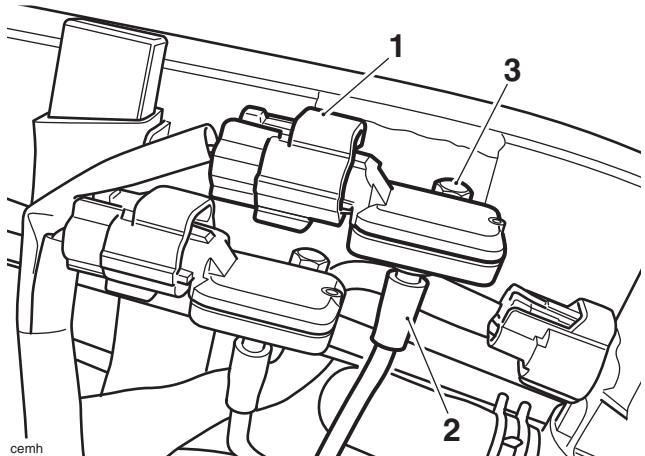
MAP Sensor

Note:

- The MAP sensor hoses and electrical connections must not be swapped between cylinders. If either of the hoses or connections are swapped over, engine malfunctions will occur.
- The left hand cylinder (cylinder 1) harness is marked 'Cylinder 1'.
- The right hand MAP (Cylinder 2) sensor harness is marked with red tape.
- The right hand MAP (Cylinder 2) sensor hose is marked with a red dot.

Removal

- Disconnect the battery, negative (black) lead first.
- Remove the fuel tank (see page 10B-76).
- Disconnect the vacuum hose from the sensor.
- Disconnect the map sensor multi-plug.



- Release the fixing screw securing the sensor to the frame and remove the sensor.

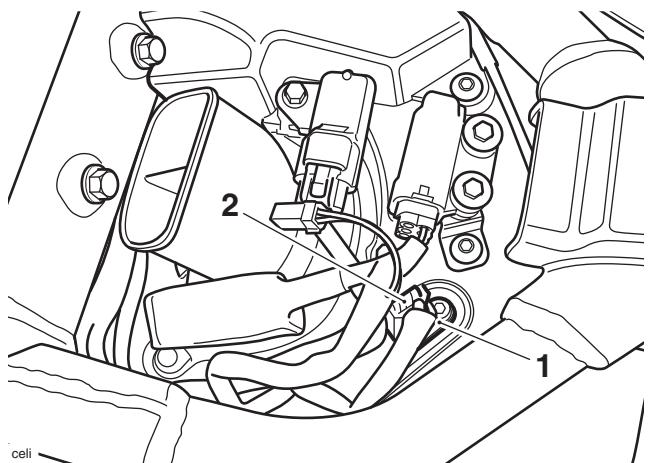
Installation

- Fit the sensor to the frame, tightening the fixing to **3 Nm**.
- Refit the vacuum hose.
- Reconnect the map sensor multi-plug.
- Refit the fuel tank (see page 10B-77).
- Reconnect the battery, positive (red) lead first.

Intake Air Temperature Sensor

Removal

- Disconnect the battery, negative (black) lead first.
- Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
- Disconnect the intake air temperature sensor multi-plug.



1. Intake air temperature sensor

2. Multi-plug

- Release the fixing screw securing the sensor to the airbox and remove the sensor.

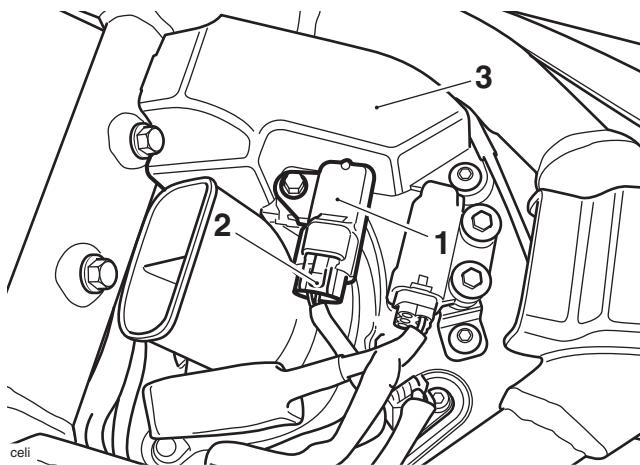
Installation

- Fit the sensor to the airbox, tightening the fixing to **5 Nm**.
- Reconnect the intake air temperature sensor multi-plug.
- Refit the seat (see page 16-16).
- Reconnect the battery, positive (red) lead first.

Barometric Pressure Sensor

Removal

1. Disconnect the battery, negative (black) lead first.
2. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390)
3. Disconnect the barometric pressure sensor multi-plug.



1. Barometric pressure sensor

2. Multi-plug

3. Cable cover

4. Release the fixing screw securing the sensor to the cable cover and remove the sensor.

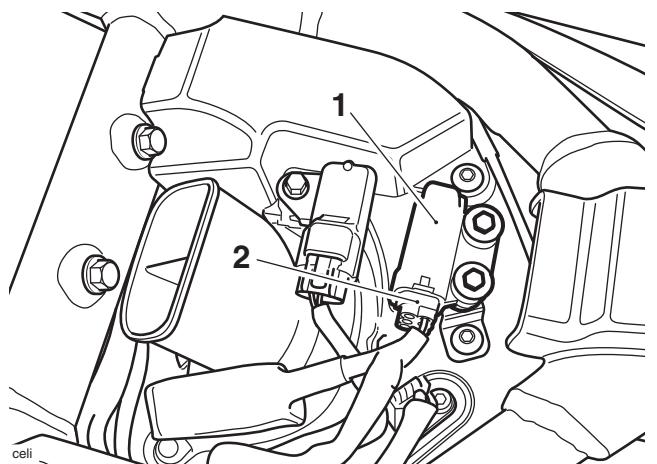
Installation

1. Fit the sensor to the cable cover, tightening the fixing to **3 Nm**.
2. Reconnect the barometric pressure sensor multi-plug.
3. Refit the seat (see page 16-16).
4. Reconnect the battery, positive (red) lead first.

Fall Detection Switch

Removal

1. Disconnect the battery, negative (black) lead first.
2. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
3. Disconnect the fall detection switch multi-plug.



1. Fall detection switch

2. Multi-plug

4. Release the two fixings securing the sensor to the airbox and remove the sensor.

Installation

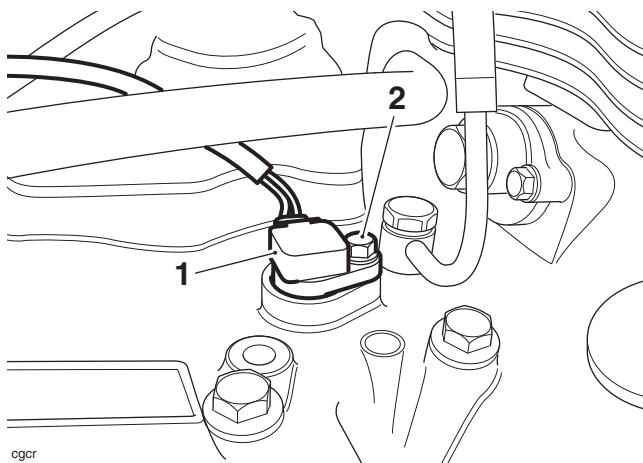
1. Fit the sensor to the airbox, tightening the new fixings to **3 Nm**.
2. Reconnect the fall detection switch multi-plug.
3. Refit the seat (see page 16-16).
4. Reconnect the battery, positive (red) lead first.

Fuel System - Fuel Injected Models

Road Speed Sensor

Removal

1. Disconnect the battery, negative (black) lead first.
2. Release the screw securing the sensor to the upper crankcase, below the throttle body.



1. Road speed sensor

2. Fixing

3. Ease the sensor out of the crankcase. Discard the sensor O-ring.
4. Noting its routing, trace the sensor wiring back to the connector. Disconnect the sensor and detach it from the motorcycle.

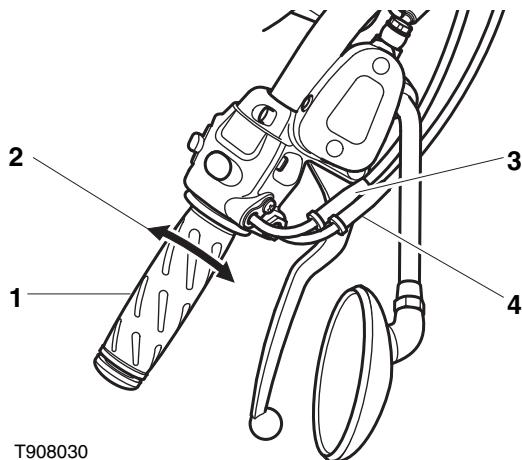
Installation

1. Fit a new O-ring to the sensor. Lubricate the O-ring with a smear of petroleum jelly.
2. Position the sensor to the engine and secure with the screw. Tighten to **10 Nm**.
3. Re-route the harness as noted during disassembly, and reconnect the sensor electrical connector to the harness.
4. Reconnect the battery, positive (identified with red tape) lead first.

Throttle Cables

Inspection

1. Throttle cable adjustment is checked by measuring the amount of free play at the twist grip. Adjustment is correct when 2 - 3 mm of free play movement is present.

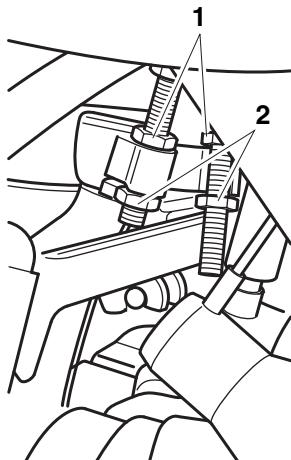


T908030

1. **Twist grip**
2. **Free play**
3. **Opening cable adjuster**
4. **Closing cable adjuster**

Adjustment

- To adjust the cables, slacken the lock nuts and back-off the opening and closing cable upper adjusters.
- Set the opening cable adjuster to give 2 - 3 mm of free play at the twist grip then securely tighten the lock nut.
- If there is insufficient adjustment available, back-off the upper adjuster and adjust the free play at the throttle body end of the cable. Slacken the cable lock nuts and position them so all but a small amount of free play is removed from the cable. Securely tighten the lock nuts then carry out final adjustment with the upper adjuster.



1. Lower adjusters

2. Lock nuts

- Once the opening cable is correctly adjusted, repeat the procedure for the closing cable.
- 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.

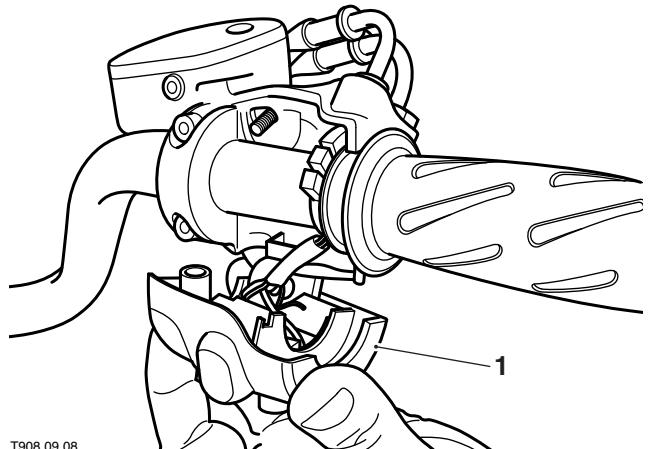


Warning

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.

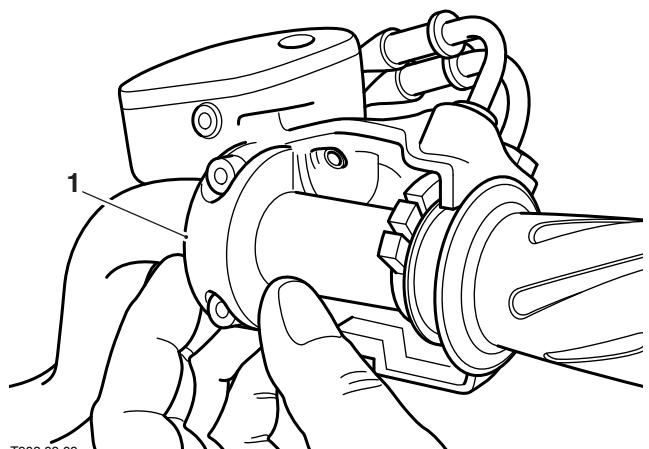
Removal

- Remove the fuel tank (see page 10B-76).
- America LT only:** Remove the windscreens (see page 16-26).
- Undo the screws and free the right switchgear assembly from the master cylinder.



1. Right hand switchgear assembly

- Slacken the nut and screw securing the throttle cable end fittings to the master cylinder.
- Unscrew the bolts and remove the mounting clamp from the master cylinder.



1. Master cylinder mounting clamp

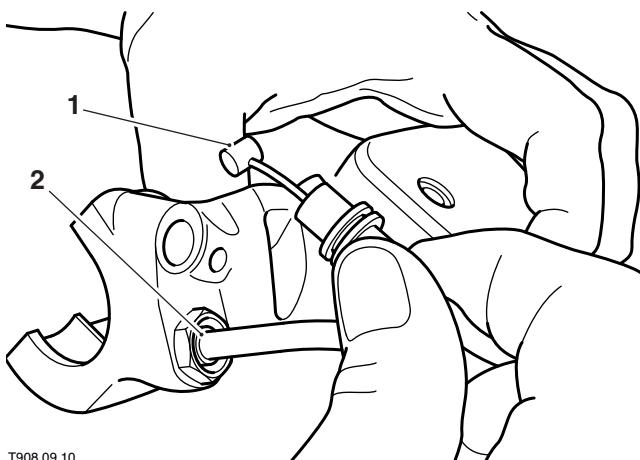
- Free the master cylinder from the handlebars and detach the cables from the twist grip.

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 throttle body bracket to gain the necessary free play to allow them to be disconnected from the twist grip.

Fuel System - Fuel Injected Models

7. Unscrew the nut and screw and free the throttle cables from the master cylinder.



T908.09.10

1. **Opening cable**
2. **Closing cable**

8. Slacken the lock nuts then detach each cable from the throttle linkage.

Note:

- **Free the throttle bodies from the cylinder head to improve access to the throttle linkage.**
- 9. Note the correct routing of each cable then free them from the retaining clips and remove them from the motorcycle.

Inspection

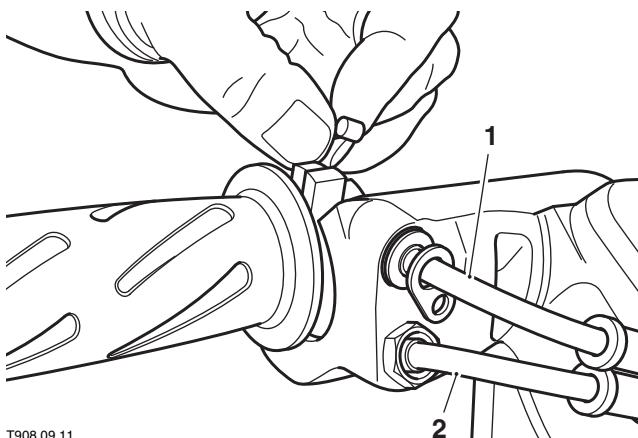
1. Check each inner cable for free movement through the outer cable.
2. Examine each inner cable for damage, fraying etc.
3. Examine the inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

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 throttle body 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 twist grip.



T908.09.11

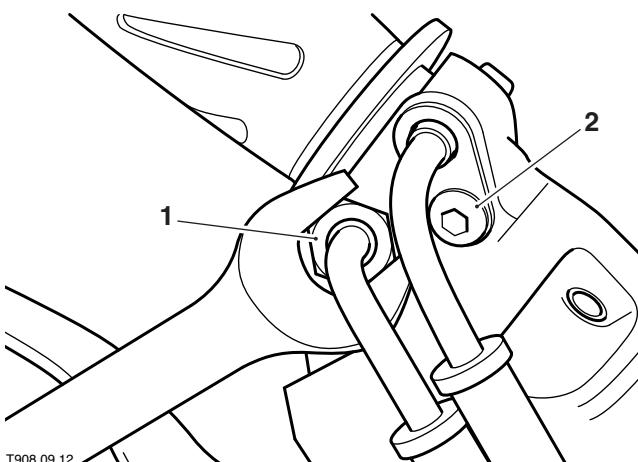
1. **Opening cable**
2. **Closing cable**

4. Locate the master cylinder on the handlebars and fit the mounting clamp. Align the clamp lower split with the punch mark on the handlebar and tighten the upper clamp bolt to **12 Nm** then tighten the lower clamp bolt to **12 Nm**.
5. Refit the switchgear assembly, tightening its screws to **2.5 Nm**.

Note:

- **On America models up to VIN 468389 and Speedmaster models, prior to assembly, tuck the wiring connector for the indicator into the recess in the front half of the switchgear.**

- Securely tighten the nut and screw securing the throttle cables to the master cylinder.



- Closing cable nut**
- Opening cable screw**

- Position the lower adjuster lock nuts so only a small amount of free play is present in each cable then tighten them securely.
- Operate the twist grip 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.

- America LT only:** Refit the windscreens (see page 16-26).
- Install the fuel tank (see page 10B-77).

Throttle Bodies

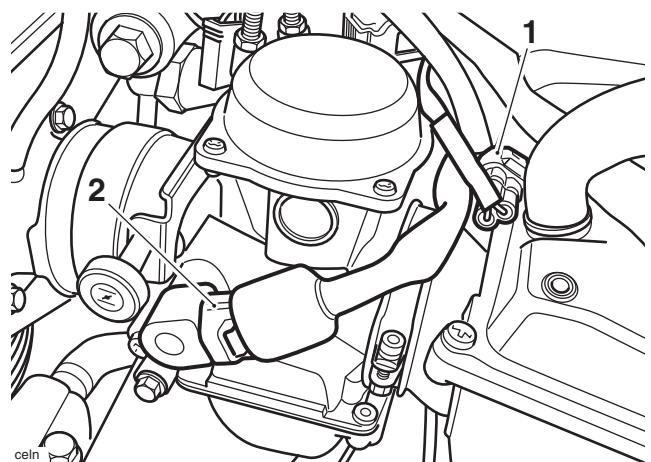
! Warning

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

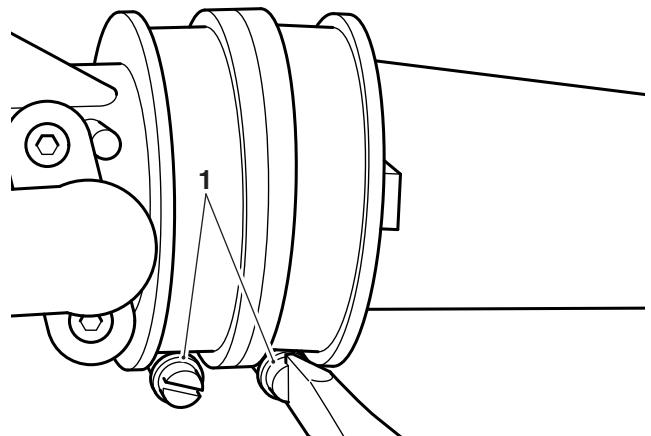
- Remove the fuel tank (see page 10B-76).
- Disconnect the wiring connectors from the fuel injectors and the throttle position sensor.



- Injector connector**

- Throttle position sensor connector**

- Release the retaining clips securing the airbox rubbers to the throttle bodies.
- Slacken the retaining clips securing the intake rubbers to the throttle bodies and cylinder head adaptors.



- Retaining clip screws**

- Free the throttle bodies from the intake rubbers and manoeuvre them out of position.

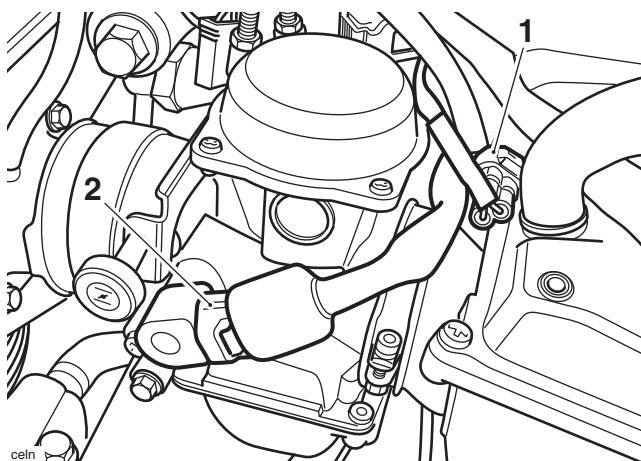
Fuel System - Fuel Injected Models

Note:

- Lubricate the intake rubbers with a silicone-based spray lubricant to ease removal.
- 6. Slacken the throttle cable lock nuts and, noting their position, detach both cables from the throttle linkage.
- 7. Remove the throttle bodies.

Installation

1. Reconnect the throttle cables to the throttle bodies, ensuring they are connected the right way around. Adjust the cable free play then securely tighten the lock nuts.
2. Ensure the clips are all in position then lubricate the intake and airbox rubbers with a silicone-based spray lubricant.
3. Manoeuvre the throttle bodies into position and engage them correctly with the intake and airbox rubbers.
4. Ensure the throttle bodies are correctly seated in the intake rubbers then securely tighten the retaining clips to **1.5 Nm**.
5. Ensure the airbox rubbers are correctly seated on the throttle bodies then securely tighten the retaining clips to **1.5 Nm**.
6. Reconnect the wiring connectors from the fuel injectors and the throttle position sensor.



1. Injector connector

2. Throttle position sensor connector

7. Check the throttle cables are correctly adjusted and install the fuel tank (see page 10B-77).

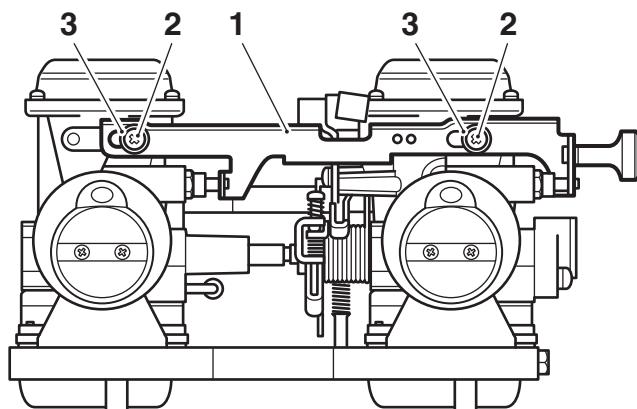
Throttle Body Overhaul

Disassembly

Note:

- It is permissible to renew the fuel injectors, the fuel injector seals, and the throttle position switch. Replacement of any other component requires replacement of the throttle bodies as an assembly.
- During the following procedure four different sizes of spring will be removed. It is important these springs are correctly installed in their original positions during reassembly. Note the size and position of each spring before removal.

1. Remove the throttle bodies (see page 10B-91). Renew the fuel injectors as follows:
2. Remove the two choke rod screws and collect the nylon washers.



celr

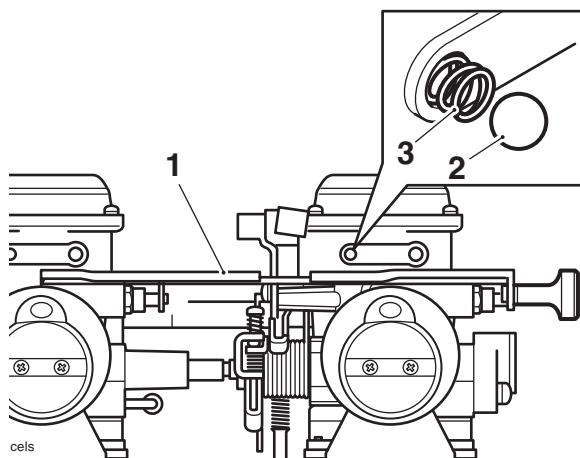
1. Choke rod

2. Screws

3. Nylon washers

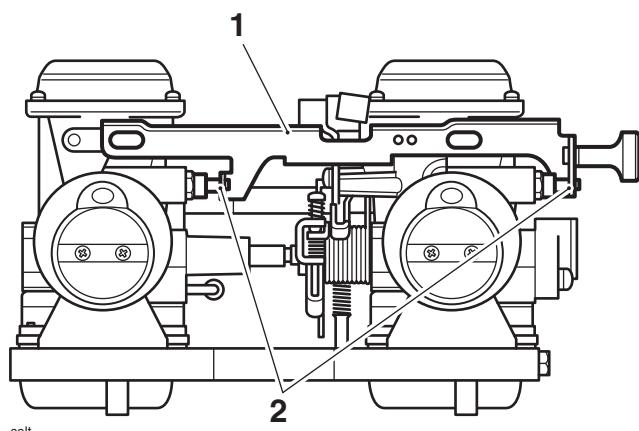
Fuel System - Fuel Injected Models

3. Rotate the choke rod carefully and slowly downwards and collect the detent ball and spring, and the remaining two nylon washers. Note the size and position of the spring before removal.



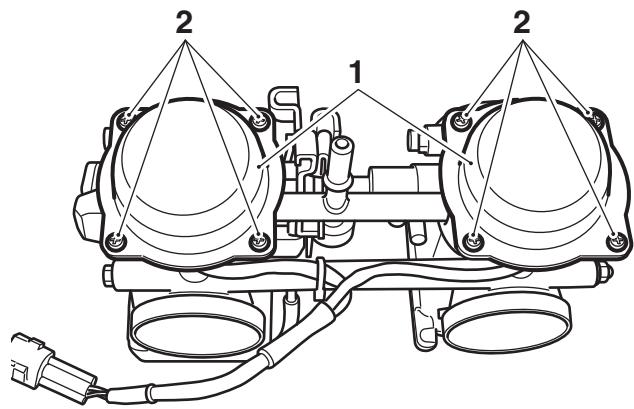
- 1. Choke rod**
2. Detent ball
3. Spring

4. Slide the choke rod upwards to remove it, collecting the two springs from the choke plungers as they are released. Note the size and position of each spring before removal.



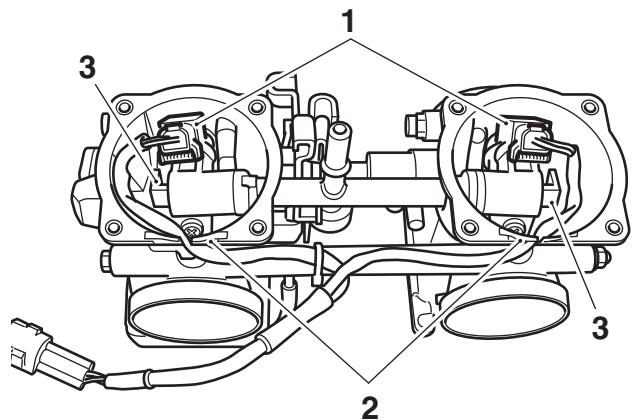
- 1. Choke rod**
2. Choke plunger springs

5. Remove the eight fixings and remove the two upper chamber covers.



- 1. Upper chamber covers**
2. Fixings

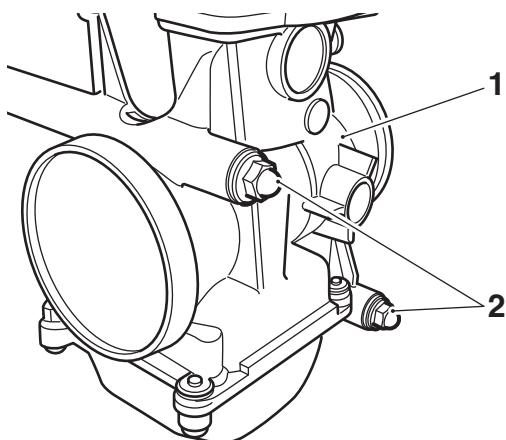
6. Disconnect the two injector electrical connectors and remove the two blanking plates. Release the harness from the cable guides on the fuel rail. It is not necessary to completely remove the injector sub-harness from the throttle body.



- 1. Fuel injector connectors**
2. Blanking plates
3. Cable guides

Fuel System - Fuel Injected Models

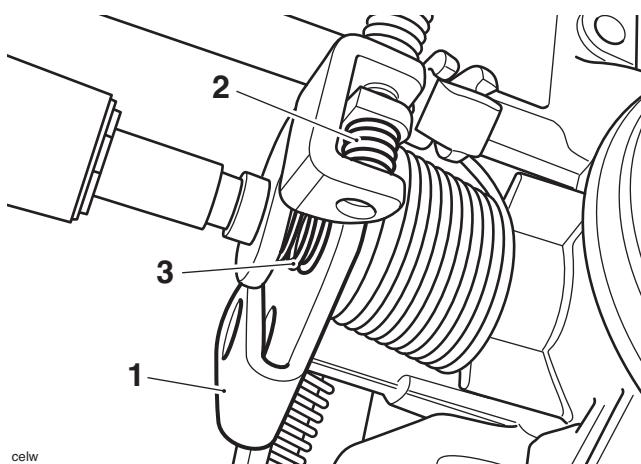
7. Remove the two nuts and withdraw the two long bolts from the left hand side of the throttle bodies.



cely
1. Right hand throttle body

2. Nuts

8. Gently ease the two throttle bodies apart until the two springs between the throttle linkage are released, taking care not to lose them. Remove the two springs noting the size and position of each before removal.



celw
1. Throttle cam

2. Throttle shaft balance spring

3. Throttle spindle thrust spring

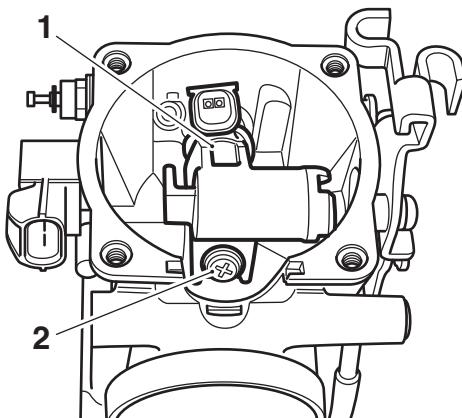
9. Gently separate the two throttle bodies by easing the fuel rail out of the right hand fuel injector.

Note:

- **The two aluminium throttle body spacer tubes may remain in either throttle body during disassembly, or may become detached during removal.**
10. Gently ease the fuel rail out of the left hand fuel injector.
11. Working on one throttle body at a time, remove the screw and remove the fuel injector.

Note:

- **The fuel injector seal may be removed with the fuel injector or may remain in the throttle body. If necessary, carefully remove the seal from the throttle body.**



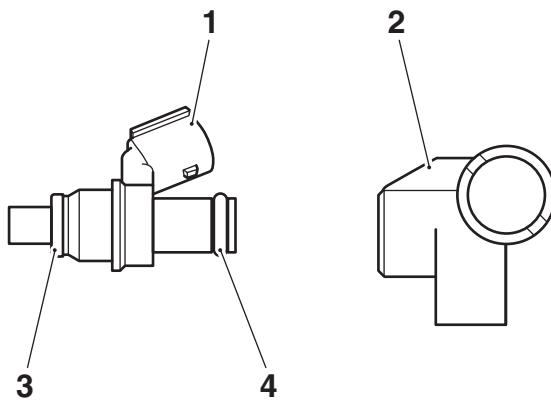
celx
1. Fuel injector

2. Fixing

Note:

- **The fuel rail adaptors are different and are not interchangeable.**

12. Remove the fuel rail adaptor and discard the injector seals.



cemf
1. Fuel injector

2. Fuel rail adaptor (right hand shown)

3. Injector seal (front)

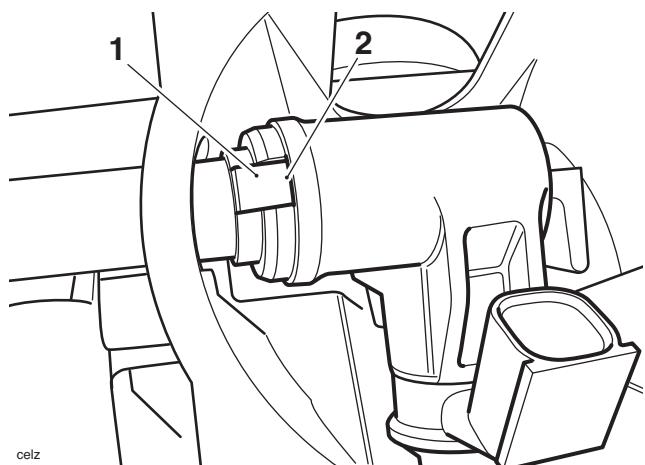
4. Injector seal (rear)

13. Repeat steps 11 and 12 for the remaining fuel injector.

Fuel System - Fuel Injected Models

Assembly

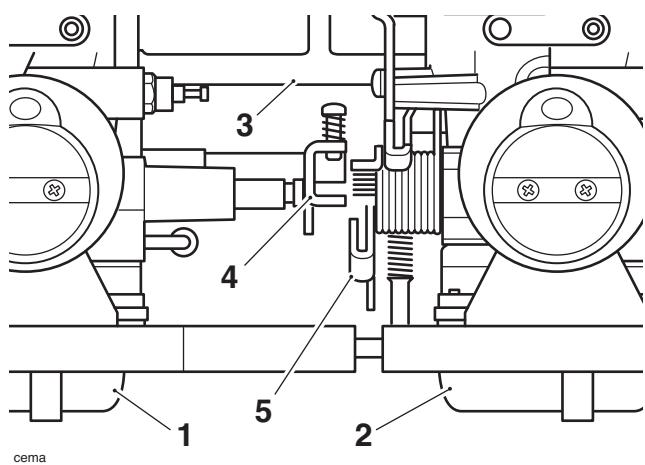
1. Install new seals to each fuel injector, ensuring the front seal is installed with its radiused edge facing towards the engine. Fit the fuel rail adaptor to the fuel injector as noted during removal.
2. Install the fuel injectors to the throttle bodies and secure with the screws. Tighten to **3.5 Nm**.
3. Lubricate the seals on the fuel rail with clean engine oil. Install the fuel rail into the left hand fuel injector adaptor, ensuring the two lugs locate in the corresponding slots in the injector.



1. Fuel rail lug (upper shown)

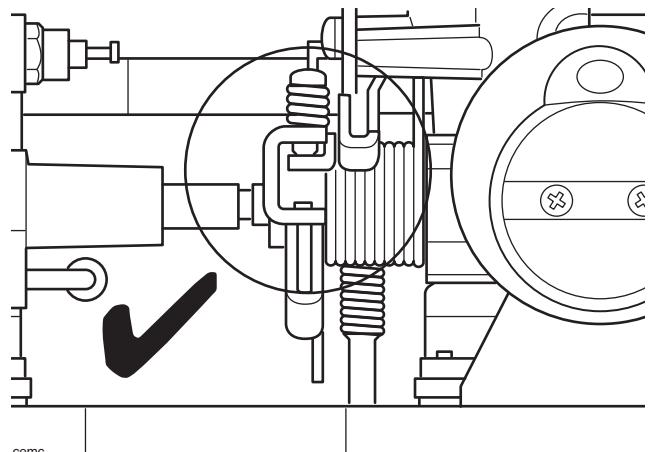
2. Fuel injector slots

4. Install the two long bolts to the left hand throttle body. Align the right hand throttle body to the bolts and install until the fuel rail begins to engage into the right hand fuel injector adaptor.

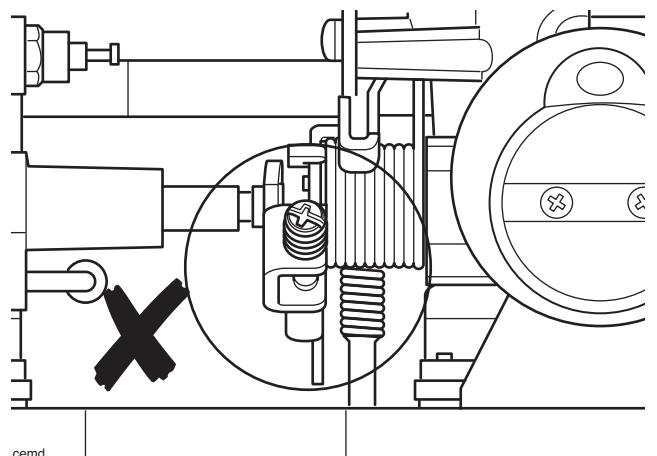


- 1. Right hand throttle body**
- 2. Left hand throttle body**
- 3. Fuel rail**
- 4. Throttle linkage**
- 5. Throttle cam**

5. Ensuring both throttles are fully closed, install the fuel rail fully into the right hand fuel injector. Check that the right hand throttle linkage is engaged into the left hand throttle cam as shown below.



Correct Assembly



Incorrect Assembly

6. Refit the throttle body securing nuts, tightening to **6 Nm**.

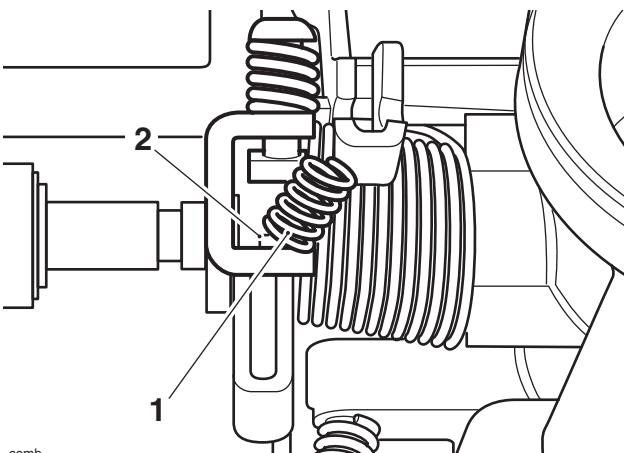


Warning

To prevent injury, always wear eye and face protection when installing springs.

Fuel System - Fuel Injected Models

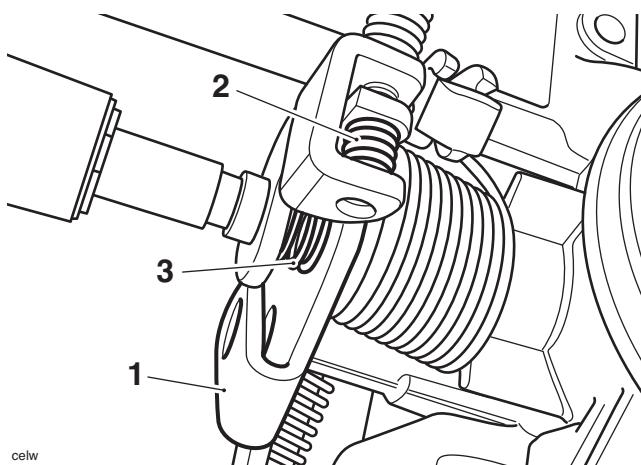
7. Fit the throttle shaft balance spring as shown below, ensuring the spring is installed over the lug on the throttle linkage.



1. Throttle shaft balance spring

2. Lug

8. Fit the throttle spindle thrust spring as shown below.



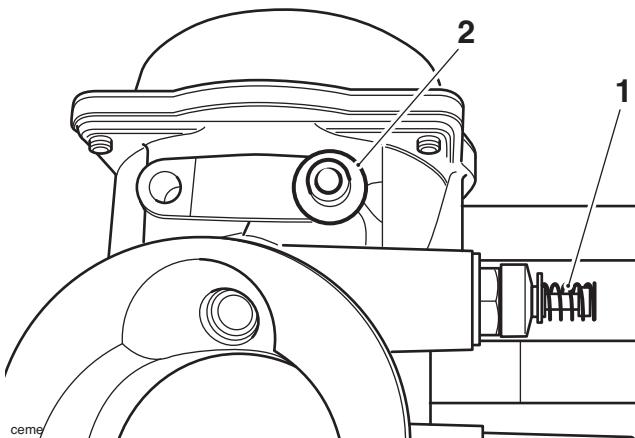
1. Throttle cam

2. Throttle shaft balance spring

3. Throttle spindle thrust spring

9. Reconnect the electrical connectors to the fuel injectors, ensuring the grey coloured cable is connected to the left hand injector.
10. Fit the blanking plates to the upper chambers, ensuring the injector harness is clipped into the cable guide on the fuel rail and the recess provided in each blanking plate.
11. Fit the upper chamber covers and secure with the screws. Tighten to **2 Nm**.
12. Ensuring both choke plungers are in the 'OFF' position, fit the two springs to the plungers as noted during disassembly.

13. Fit the two nylon washers to the choke rod retaining bosses.



1. Choke plunger spring

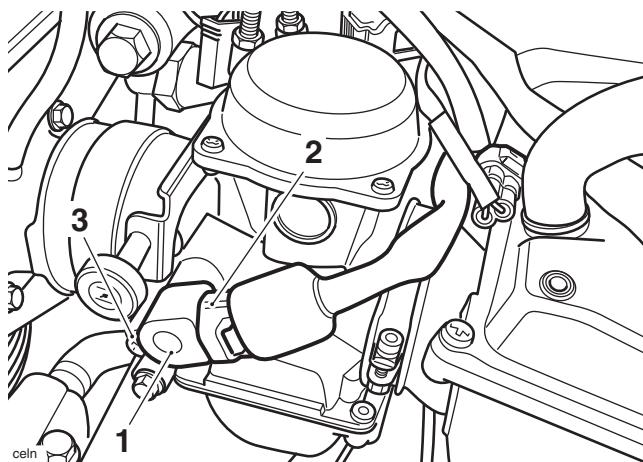
2. Nylon washer

14. Carefully install the choke rod, ensuring the two choke plunger springs remain in position. Compress the springs with the choke rod, until the two slots on the rod will engage under the flanges on the choke plungers. If necessary, adjust the position of the springs such that they seat centrally on the choke rod.
15. Rotate the choke rod upwards into its fitted position, whilst ensuring the rod is still correctly engaged in both choke plungers.
16. Fit the two remaining washers and screws, tightening to **2 Nm**. Check the operation of the choke linkage before proceeding.
17. Refit the throttle bodies (see page 10B-92) and check the synchronisation.

Throttle Position Sensor

Removal

1. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).
2. Disconnect the battery, negative (black) lead first.
3. Disconnect the wiring connector from the throttle position sensor.
4. Release the screw and gently rotate the throttle position sensor counter clockwise.
5. Remove the throttle position sensor from the left hand end of the throttle body. Collect the O-ring on disassembly.



- 1. Throttle position sensor
- 2. Throttle position sensor connector
- 3. Fixing

Installation

1. Lubricate the O-ring with clean engine oil. Fit the replacement throttle position sensor ensuring the O-ring is positioned correctly between the sensor and throttle body.
2. Rotate the throttle position sensor clockwise until the threaded hole in the throttle body aligns with the slot in the sensor.
3. Engage the screw and part tighten such that the sensor can still be rotated.
4. Reconnect the wiring connector to the throttle position sensor.
5. Reconnect the battery, positive (red) lead first.
6. Attach the Triumph diagnostic tool to the dedicated plug, refer to the Triumph Diagnostic Tool User Guide for additional information.
7. On the diagnostic tool and navigate to, and select the 'ADJUST TUNE' option (see page 10B-31).
8. Warm the engine up to normal operating temperature and adjust the idle speed (see page 10B-98).
9. With the idle speed correctly set, switch off the engine.
10. Turn the ignition to the 'ON' position.
11. At the next screen, select Throttle Position Sensor Renew (see below) then press the 'ADJUST' button.
12. On pressing the 'ADJUST' button, the diagnostic tool will send a command which drives the throttle to the fully closed position. The tool will also display the Voltage reading coming from the throttle position sensor.

Adjust Tune Procedure

Adjust the throttle position sensor as described in the service manual until the voltage reading is within the range shown below
Press OK when the adjustment is complete
Press cancel to cancel the adjustment process

Current Voltage: 0.59 V

Target Voltage Range: 0.58 V - 0.62 V

 Adjusting parameter - Throttle Position Sensor Adjust

13. Gently rotate the new throttle position sensor until the voltage reading on the tool shows **0.6 volts ± 0.02 volts**.

Fuel System - Fuel Injected Models

Note:

- This is a setting voltage only. Because of the adaptive nature of the engine management system, and the possible manual adjustment of the idle speed, the in-service voltage may vary from this setting figure.
- Tighten the sensor retaining screw to **3.5 Nm** and recheck the voltage reading shown on the tool. Repeat the adjustment if the reading is outside the specified range.
 - Press the **OK** button to return the throttle to normal control and return the diagnostic tool to the **Adjust Tune** menu.
 - Disconnect the diagnostic tool.
 - Check that the throttle opens and closes without obstruction/sticking and has a smooth action throughout the full range of its movement. Rectify as necessary.



Warning

Operation of the motorcycle with an incorrectly adjusted throttle position sensor, or a throttle position sensor that causes the throttle to stick could result in loss of throttle control. Loss of throttle control could result in loss of control of the motorcycle and an accident.



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.

- Check and clear any stored faults using the same tool.
- Refit the seat (see page 16-16).

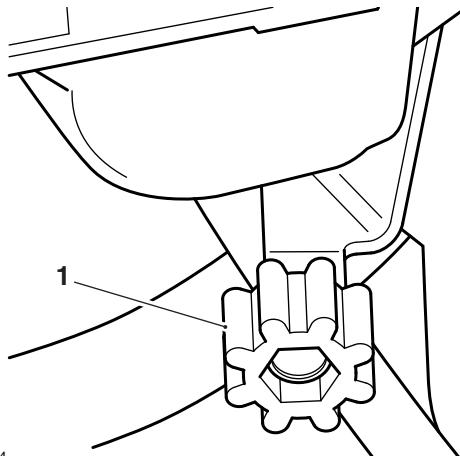
Idle speed adjustment

Note:

- The Triumph Diagnostic Tool will be needed to accurately set the idle speed.
- Adjustments should be made with the engine warmed up to normal operating temperature.

Idle speed is adjusted with the adjuster on the left hand side of the throttle bodies. Rotate the adjuster clockwise to increase idle speed and anti-clockwise to decrease it.

Idle Speed	1000 ±50 rpm
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T908.09.34

1. Idle speed adjuster

Throttle Body Balancing

Note:

- The throttles cannot be balanced using equipment to measure vacuum in each throttle. Instead, the Triumph diagnostic tool must be used.
 - Adjustments should be made with the engine warmed up to normal operating temperature.
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 seats (see page 16-15 for America up to VIN 468389, see page 16-16 for Speedmaster, America and America LT from VIN 468390).



Warning

If the engine has recently been running, the components beneath the fuel tank may be hot to the touch.

4. Connect the diagnostic tool.
5. Attach exhaust extraction hoses to the silencers.
6. Start the engine.
7. On the diagnostic tool navigate to 'ADJUST TUNE' (see page 10B-31).
8. Select 'BALANCE THROTTLES'.

Adjust Tune Procedure

Adjust the throttle balance as described in the service manual until balanced
Press cancel to cancel the adjustment process
Press OK to finish

Throttle Status: Throttles.Balanced

Cylinder 1 MAP Pressure: 450 mmHg

Cylinder 2 MAP Pressure: 451 mmHg

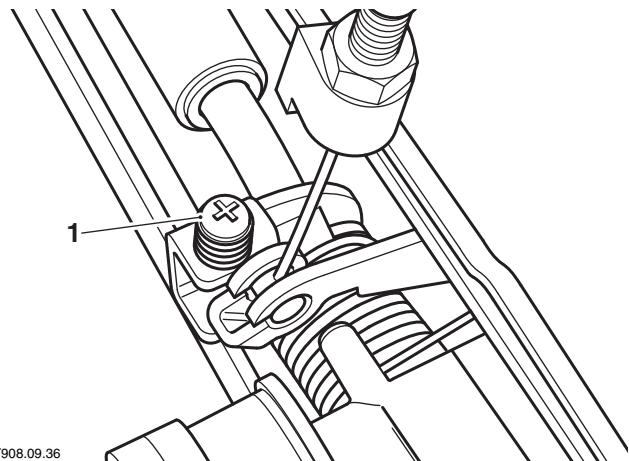


Adjusting parameter - Balance Throttles

Balance Throttles Screen

Note:

- The balance throttle screen will show the vacuum value of each throttle in mmHg. In addition, when the throttles are balanced to an acceptable range of each other the word 'THROTTLES BALANCED' in green text will appear on the right of the screen. At this point, no further adjustment is necessary or productive.
 - If the throttles are not balanced to each other the word 'THROTTLES UNBALANCED' in red text will appear on the right of the screen. At this point adjustment will be necessary.
 - Adjustment is very sensitive. Each time the screw is moved allow time for the vacuum readings to stabilise before adjusting the screw further.
9. Using the service tool 3880015-T0301 to adjust the throttle adjusters, make adjustments until the word 'THROTTLES BALANCED' appears on the right hand side of the screen.



1. Adjuster

10. When balanced, stop the engine and disconnect the diagnostic tool.
11. Refit the seat (see page 16-16).

Fuel System - Fuel Injected Models

Engine Management Adaption

General Information

The engine management system fitted to this model is adaptive. This means that the system is able to learn about new or changing operating conditions and continuously adapt itself without needing to constantly make major adjustments from a fixed baseline setting.

Adaptive changes can become necessary because of changes in fuel quality, minor defects, or because a new part may have been fitted which has slightly different characteristics to the old part. All adaptive changes are automatic and require no intervention by rider or dealer.

Adaption Status

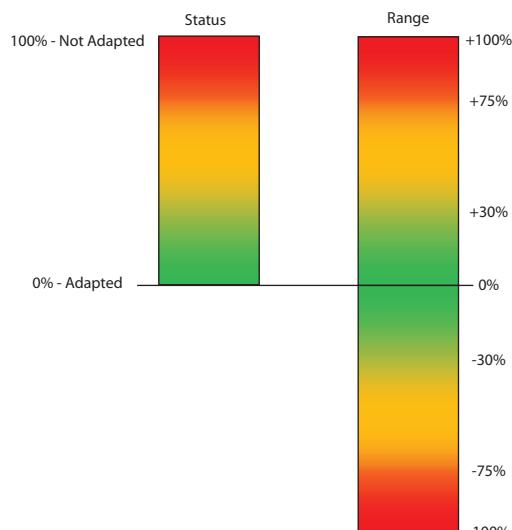
To see if a motorcycle has fully adapted, a facility named 'ADAPTION STATUS' is provided on the diagnostic tool. The following adaption details can be examined:

Function Examined	Report Method
Closed throttle position reference status	Adapted/not adapted
Idle speed control adaption status	%
Oxygen sensor adaption status (off idle)	%
Oxygen sensor adaption range (off idle)	%
Oxygen sensor adaption status (idle)	%
Oxygen sensor adaption range (idle)	%

Terminology

Where the term 'status' is used, this indicates how far the present operating parameter is from the stored (baseline) value. The nearer these figures are to zero the better as it indicates the motorcycle has adapted to its current operating conditions.

The term 'range' indicates how much (in percentage terms) of the adjustment range has been used to reach the current operating status.



Status Versus Range

Typical Values

In a correctly adapted motorcycle, the following will be typical:

Function Examined	Read Out
Closed throttle position reference status	Adapted
Idle speed control adaption status	Between +100 and -100%
Oxygen sensor adaption status (off idle)	0% +/- 10%
Oxygen sensor adaption range (off idle)	Between +100 and -100%
Oxygen sensor adaption status (idle)	0% +/- 10%
Oxygen sensor adaption range (idle)	Between +100 and -100%

Forcing adaption to take place

If the read out indicates that the motorcycle is not adapted, the following will force the system to make adaptions:



Warning

Never start the engine or let it run for any length of time in a closed area. The exhaust fumes are poisonous and may cause loss of consciousness and death within a short time. Always operate the motorcycle in the open-air or in an area with adequate ventilation.

Note:

- Resetting adaptions with the motorcycle connected to an exhaust extraction system may cause incorrect values to be set, causing poor engine running. Always reset the adaptions with the engine disconnected from any exhaust extraction system whilst ensuring the motorcycle is positioned in a well ventilated area.**
1. Ensure the engine is cold.
 2. WITHOUT TOUCHING THE THROTTLE, start the engine and allow it to warm up to 60°C.
 3. Leave the engine to idle for a further 12 minutes.

Note:

- As an alternative to the above process, connect the diagnostic tool, select ADJUST TUNE (see the Triumph Diagnostic Tool User Guide) and select RESET ADAPTIONS. This will force a fast adaption routine to take place in around 5 seconds. For this to happen, the engine MUST be running, it must be at normal operating temperature and in closed loop control mode. Under any other conditions fast adaption will not take place and may cause default values to be loaded, which may then require a normal 12 minute adaption routine to be run.**

Fault Indications

If 'range' figures at 100% are seen, then the adjustment has reached maximum indicating a mechanical fault exists on the motorcycle. This can be due to a number of faults but the most likely causes will be low/high fuel pressure, faulty injectors or air leaks at the throttle bodies or airbox.

In these circumstances, locate and rectify the fault, and reset the adaptions as described above.

Secondary Air Injection System

The secondary air injection system is an aid to reducing levels of pollutants in the exhaust gases. It does this by introducing a small amount of air into each exhaust port as the exhaust valve opens. The introduced air helps promote further combustion of the fuel mixture in the exhaust system after it has left the combustion chamber.

At certain specific engine speeds (determined by the factory programming of the engine management system), the secondary air injection relay valve is opened by the ECM and allows an air feed into the secondary air system where, each time a pair of exhaust valves open, the exhaust gases in the exhaust port create a depression which causes reed valves in the secondary air injection system to open. When open, the depression in the exhaust port draws air from the relay valve, through the open reed valves, into the exhaust port. This air promotes secondary combustion of the exhaust gases in the ports and the header system.

Check

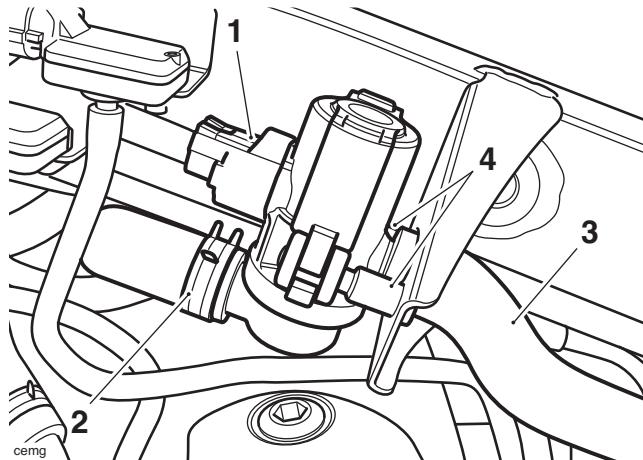
1. At regular intervals (see maintenance schedule), disassemble the control valve and inspect the reed valve assemblies. Renew the valves if there is any doubt about their condition.

Fuel System - Fuel Injected Models

Secondary Air Injection System Control Valve

Removal

1. Remove the fuel tank (see page 10B-76).
2. Disconnect the two hoses from the valve, noting the correct fitted location of each hose.
3. Disconnect the multi-plug.



1. Multi-plug
 2. Cylinder head hose
 3. Airbox hose
 4. Mounting studs
4. Gently ease the valve off the two mounting studs and remove from the motorcycle.

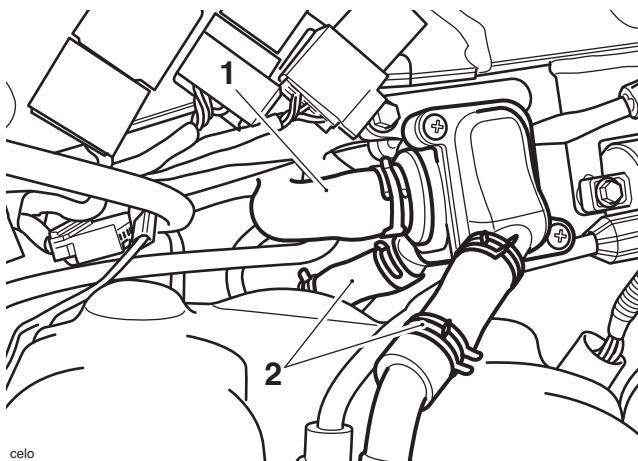
Installation

1. Align the valve to the mounting studs.
2. Reconnect the multi-plug.
3. Reconnect the two hoses.
4. Refit the fuel tank (see page 10B-77).

Secondary Air Injection System Reed Valve

Removal

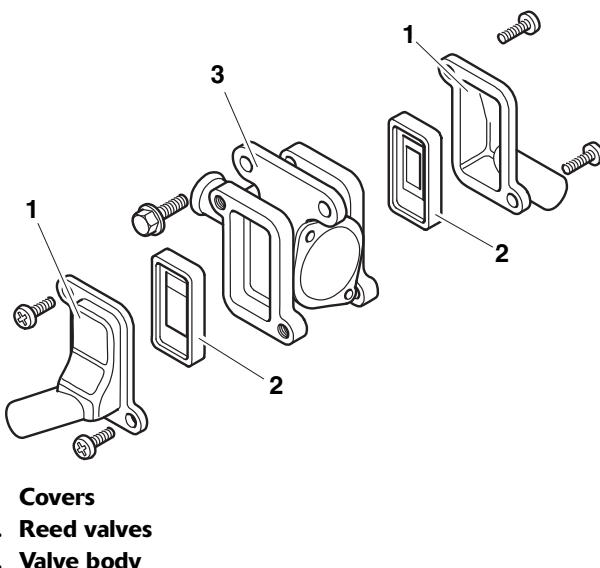
1. Remove the fuel tank (see page 10B-76).
2. Disconnect all hoses from the valve, noting the correct fitted location of each hose.



1. Airbox hose
 2. Cylinder head 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 interchangeable.



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.

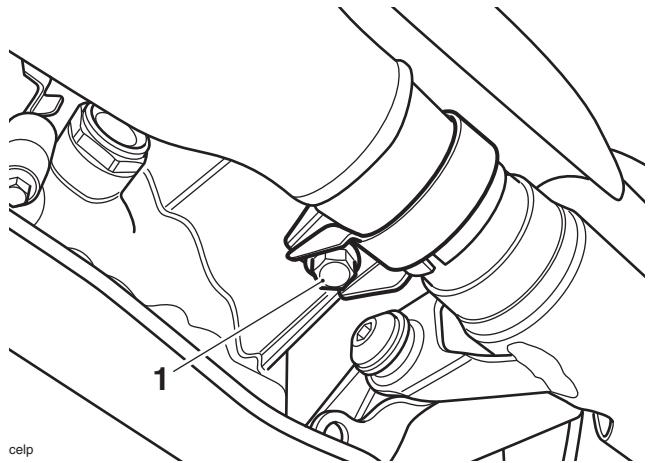
Installation

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 (see page 10B-77).

Silencers

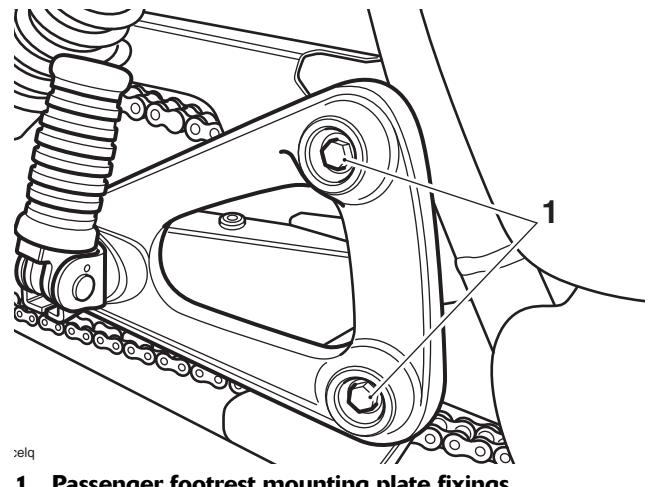
Removal

1. Slacken the clamp securing the silencer to the header pipe.



1. Silencer clamp bolt

2. **For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Slacken and remove the two fixings securing the passenger footrest mounting plate to the frame. Collect the washer from the lower fixing, located between the footrest mounting and the silencer mounting.

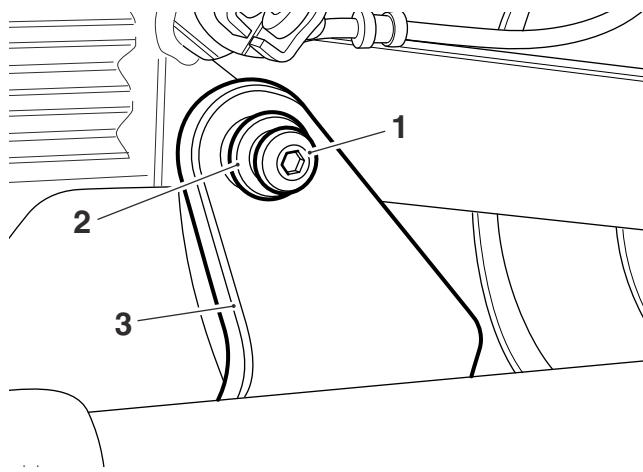


1. Passenger footrest mounting plate fixings

Fuel System - Fuel Injected Models

3. For America and America LT from VIN 468390 and Speedmaster from VIN 469050 only:

Slacken and remove the fixing and washer securing the silencer mounting to the frame.

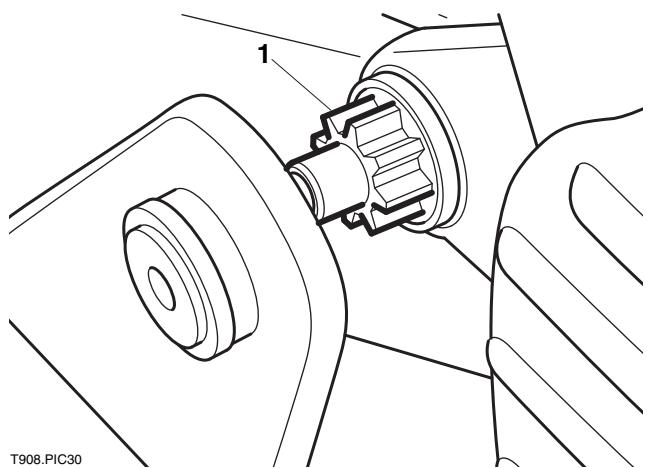


1. Fixing
2. Washer
3. Silencer mounting bracket

4. Remove the passenger footrest mounting plate.
5. Rotate the silencer away from the frame in order to dislodge the silencer mounting.
6. 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 4 cc 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. For America up to VIN 468389 and Speedmaster up to VIN 469049 only: Position the washer to the rear of the lower footrest mounting. Install the passenger footrest mounting plate. Fit the fixings, ensuring the washer is still correctly positioned, and tighten to **15 Nm**.
 6. For America and America LT from VIN 468390 and Speedmaster from VIN 469050 only: Secure the silencer to the frame by fitting the washer and fixing and tighten to **15 Nm**.
 7. Position the silencer clamp correctly and tighten its bolt to **22 Nm**.

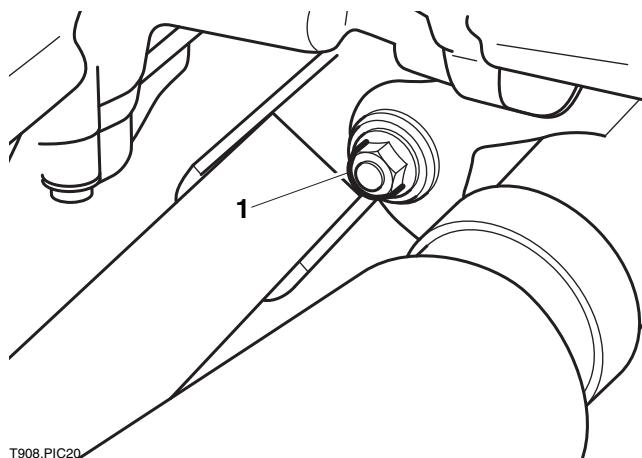
Header Pipes

Removal

1. Remove both silencers (see page 10B-103).

Note:

- The oxygen sensor electrical connections must not be swapped between cylinders. If the connections are swapped over, engine malfunctions will occur.**
 - The right hand (Cylinder 2) oxygen sensor connector on the main harness is marked with red tape.**
 - The oxygen sensors are NOT marked, always ensure the right hand oxygen sensor harness is connected to the main harness connector identified with red tape.**
2. Disconnect the oxygen sensor electrical connectors from the main harness, located above the oil cooler.
 3. Remove the fixings securing the header pipes to the frame cradle tubes.

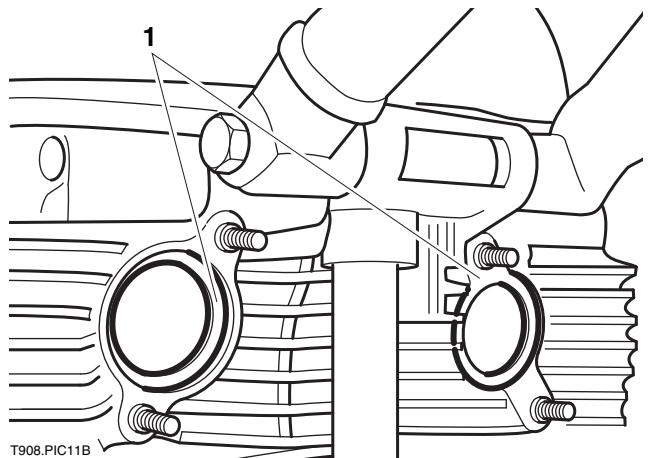


1. Header fixing

4. Release the nuts securing each header pipe to the cylinder head.
5. Slacken the clamp securing the balance pipes to each other.
6. Free the header pipes from the cylinder head, separate the balance pipes and remove both header pipes from the motorcycle.
7. 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 **22 Nm**.
8. Position the balance pipe clamp correctly and tighten its bolt to **15 Nm**.

Note:

- The oxygen sensor electrical connections must not be swapped between cylinders. If the connections are swapped over, engine malfunctions will occur.**
 - The right hand (Cylinder 2) oxygen sensor connector on the main harness is marked with red tape.**
 - The oxygen sensors are NOT marked, always ensure the right hand oxygen sensor harness is connected to the main harness connector identified with red tape.**
9. Reconnect the oxygen sensor electrical connectors.
 10. Refit the silencers (see page 10B-104).

Fuel System - Fuel Injected Models

Evaporative Emissions Control System - If Fitted

Certain Markets Only

Some models for certain markets are fitted with a system to control the evaporation of fuel vapour to the atmosphere.

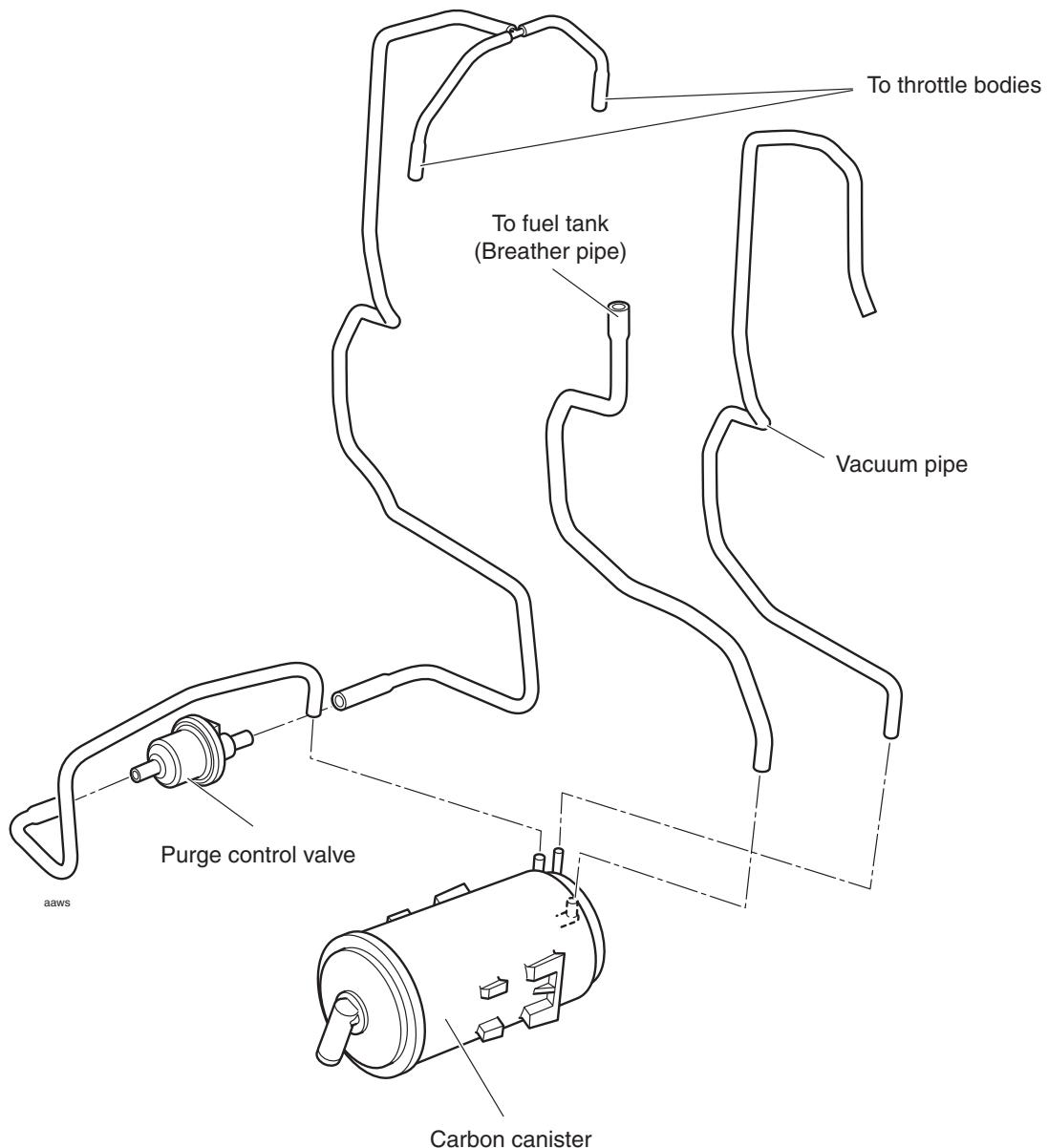
A carbon canister absorbs vapour while the engine is not running. When the engine is started, the vapour is returned to the engine and burnt.

There are two distinct phases to the system's operation, engine off and engine running. These two conditions are explained overleaf.

Component Locations

Carbon Canister - beneath the swinging arm.

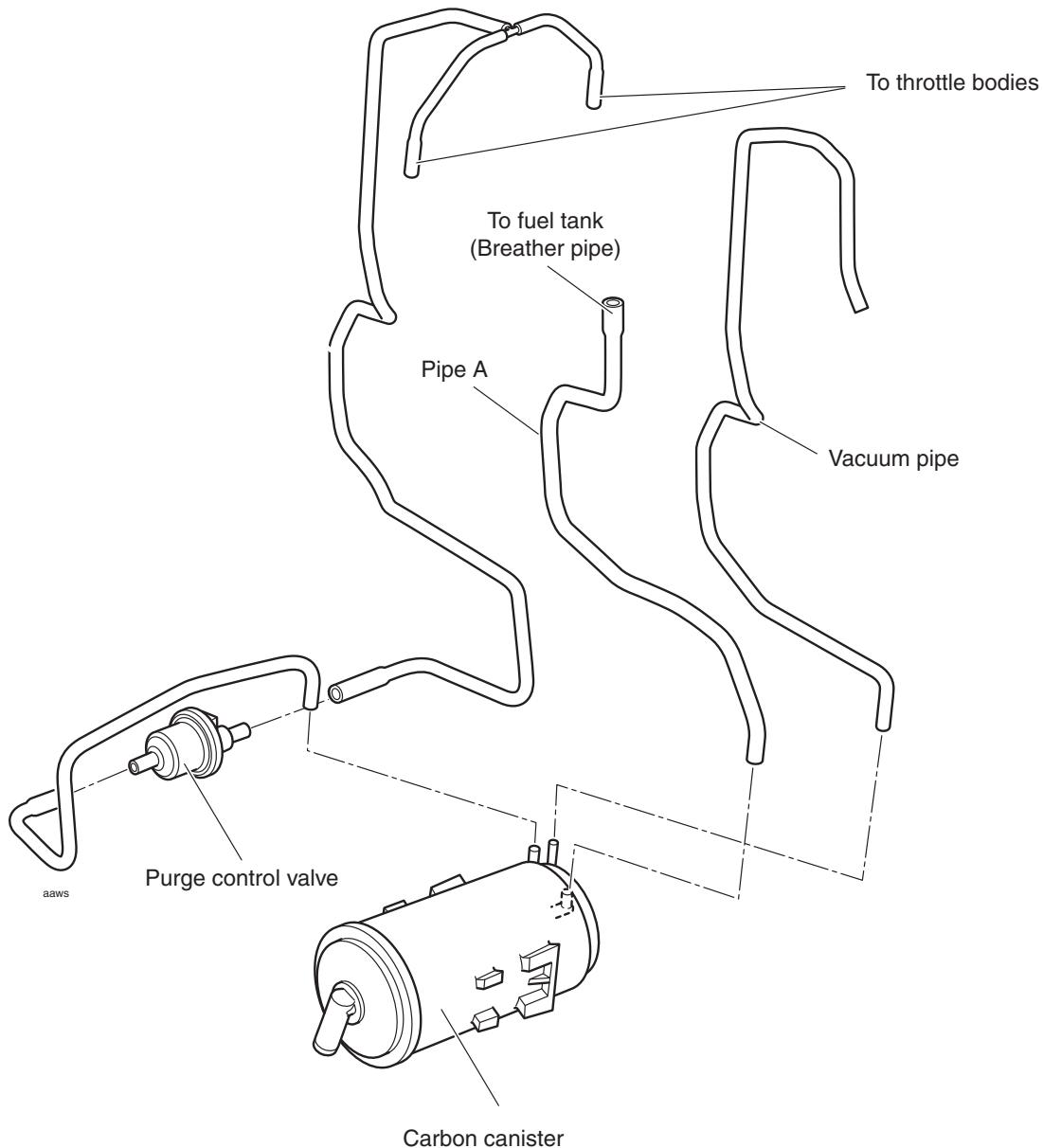
Purge Control Valve - Behind the carbon canister, mounted to the same bracket (electronically controlled by the ECM).



Evaporative Control System - Engine Off

When the engine is stationary any pressure increase in the fuel tank due to a rise in ambient temperature will cause the fuel vapour to pass down the breather pipe A to a carbon filled canister which stores the vapour.

Once in the canister, vapour cannot return to the fuel tank because of a one-way valve in the canister.



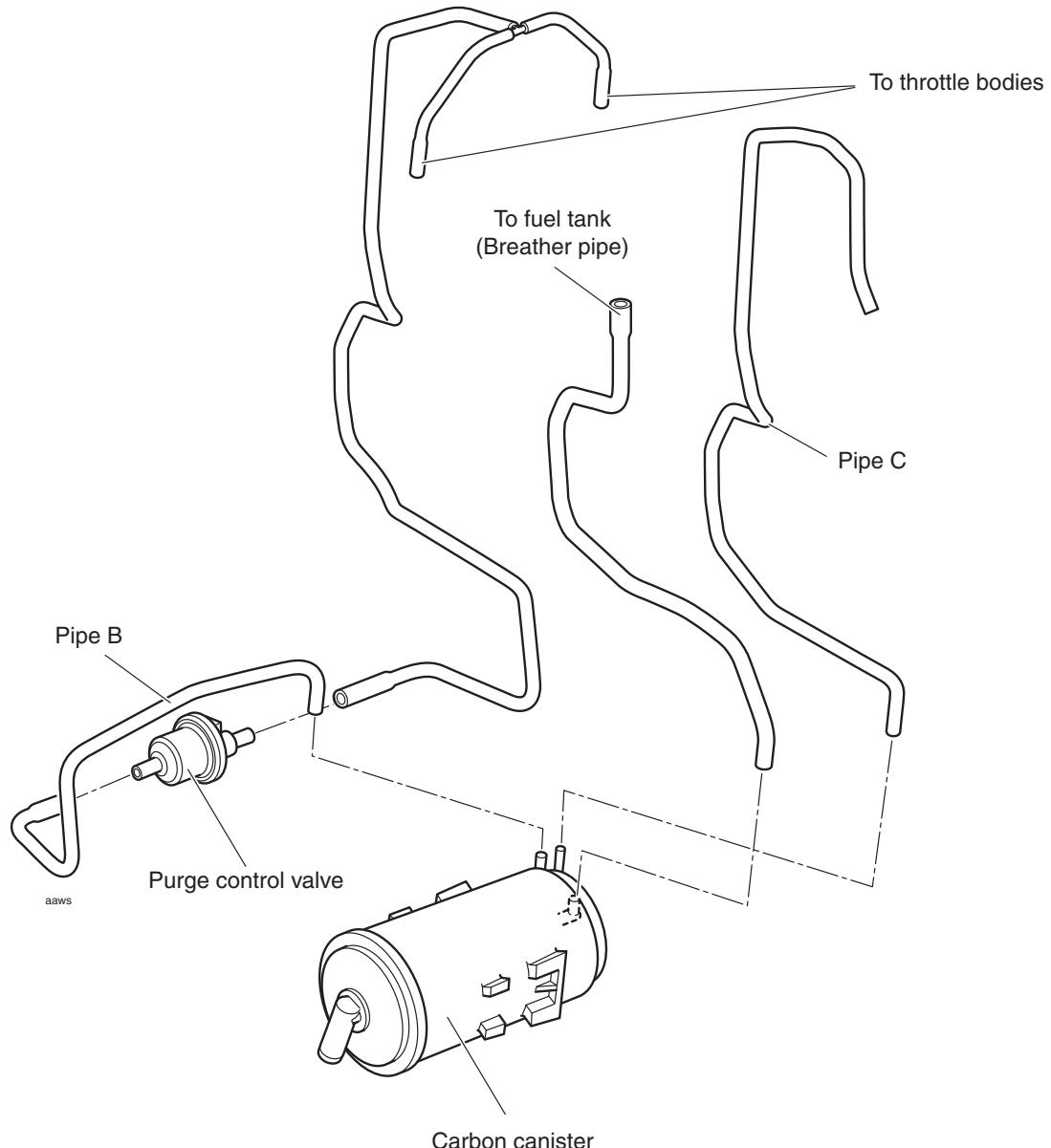
Fuel System - Fuel Injected Models

Evaporative Control System - Engine Running

When the engine is started, a vacuum is applied via the vacuum pipe C to a vent valve on the canister, causing it to open. Simultaneously, vacuum is applied along pipe B, via the purge control valve to the canister vent port.

Because the vent valve has been opened, the vacuum applied at point B begins to draw stored vapour from the carbon filled area of the canister via the vent port and returns it to the throttle bodies for burning in the engine.

In order to control the speed at which vapour is purged from the canister, the engine management system regularly shuttles the purge control valve between open and closed positions.



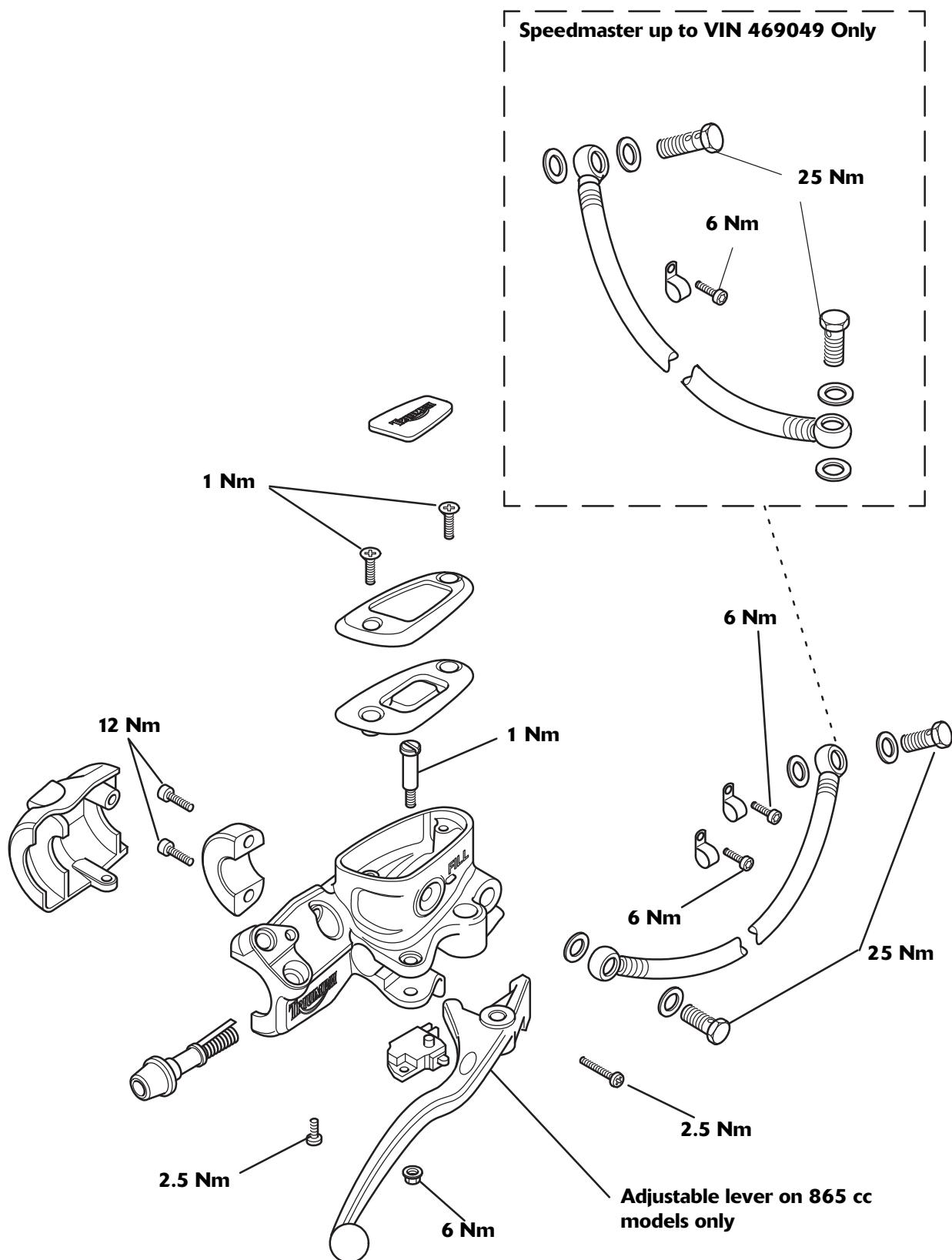
11 Brakes

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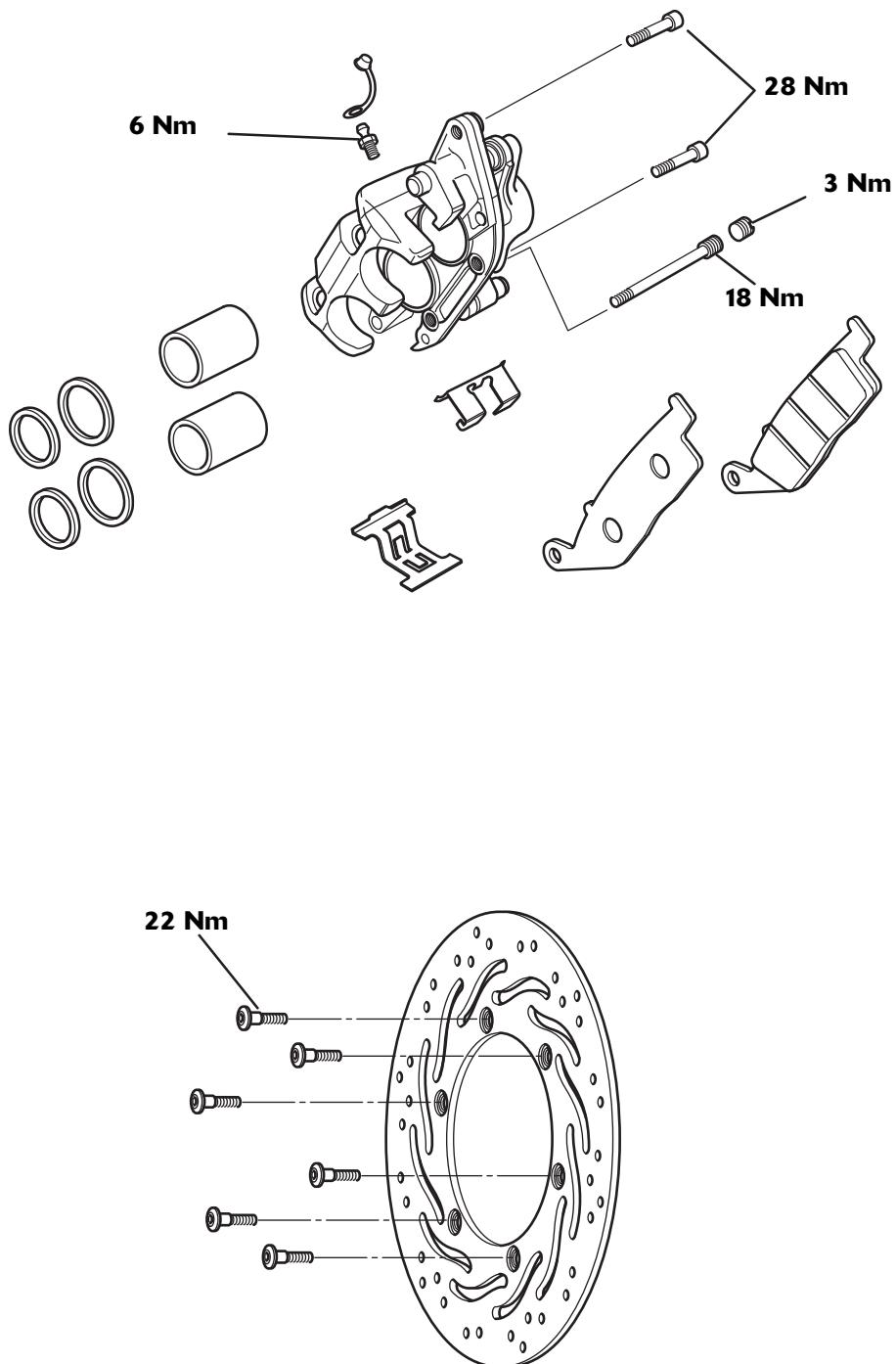
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Breaking-in New Brake Pads and Discs	11.30

Exploded View - Front Brake Master Cylinder and Hose

Brakes

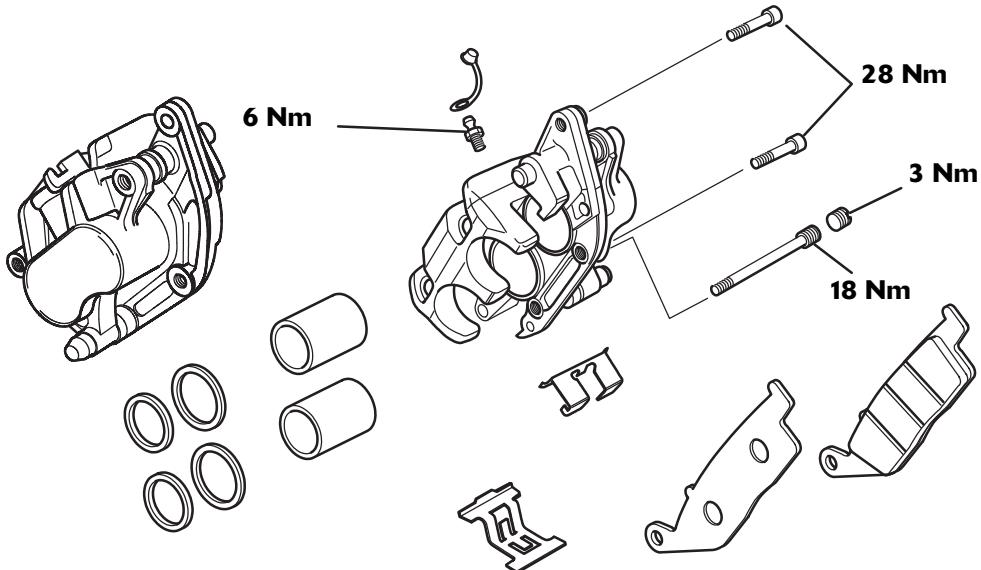
Exploded View - Front Brake Caliper and Disc - America and America LT



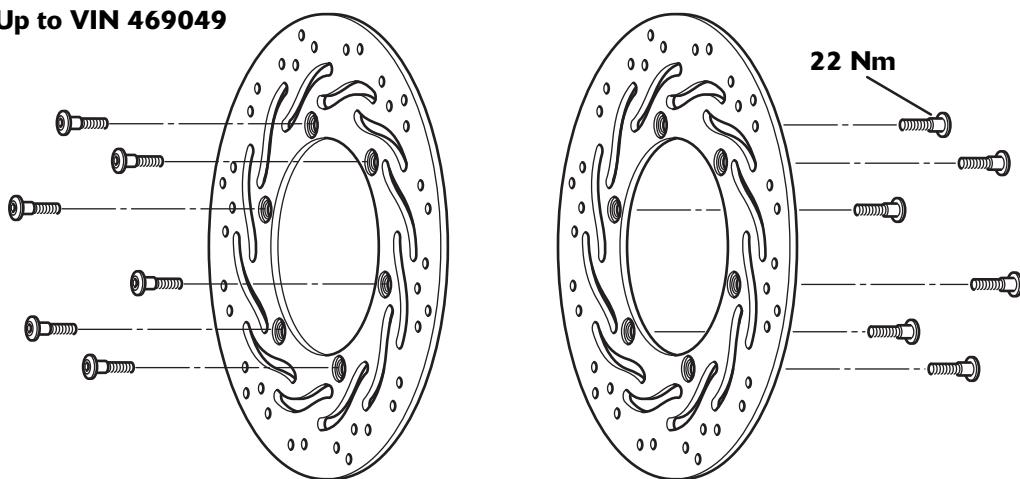
Exploded View - Front Brake Calipers and Discs - Speedmaster

Up to VIN 469049 two calipers are fitted to Speedmaster

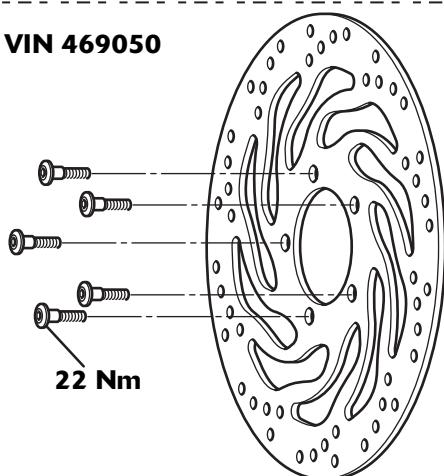
From VIN 469050 only one caliper is fitted to Speedmaster



Up to VIN 469049

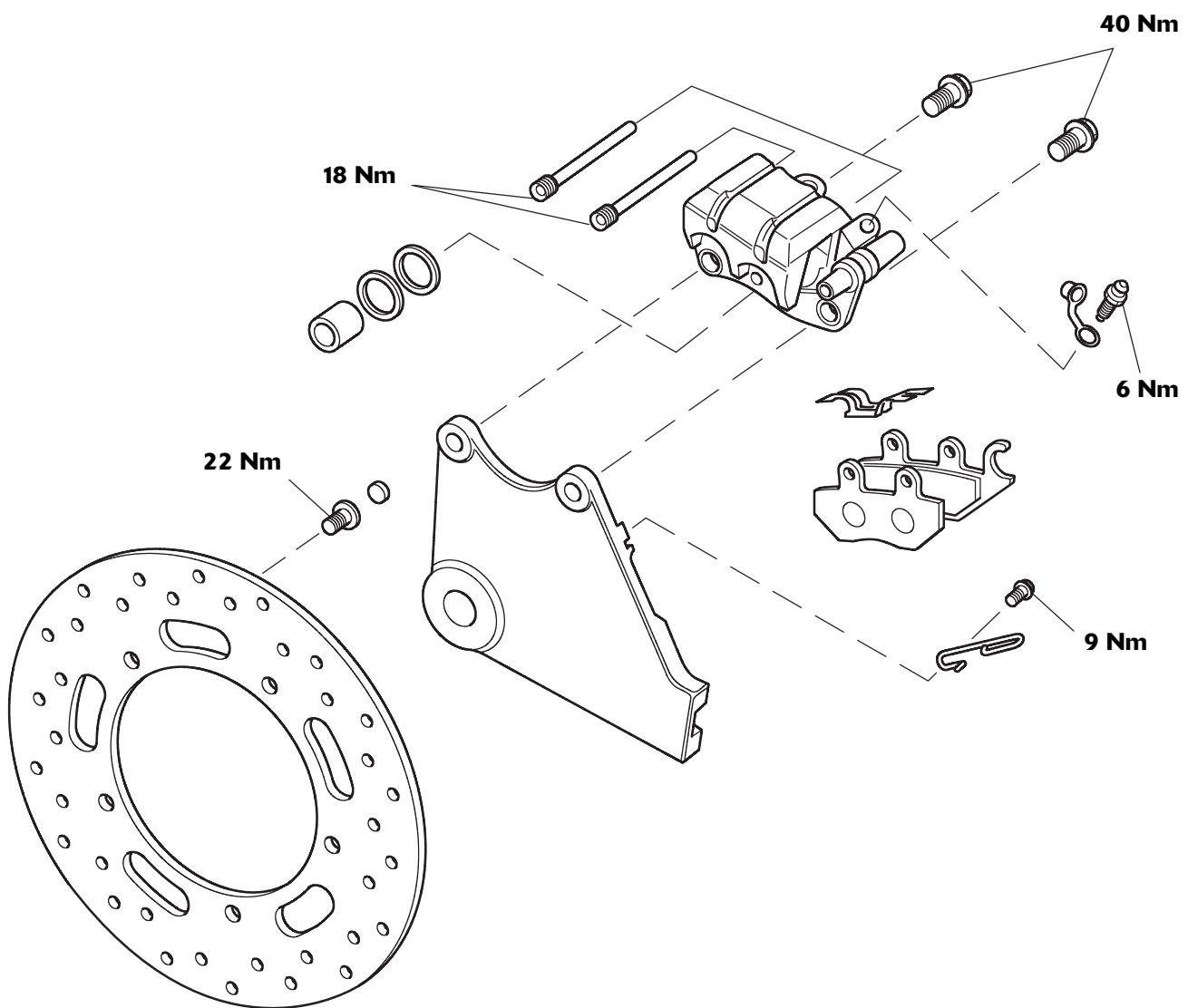


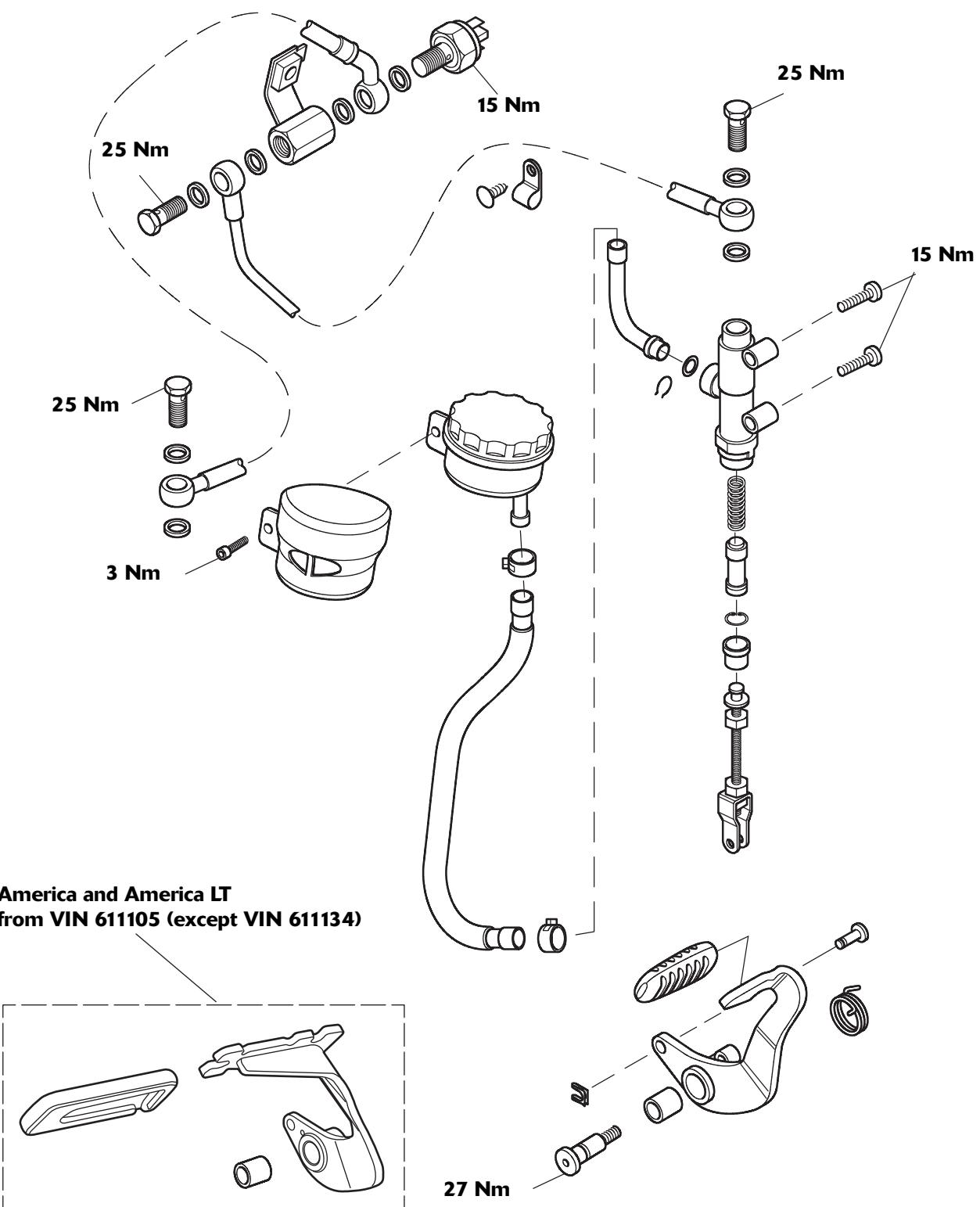
From VIN 469050



Brakes

Exploded View - Rear Brake Caliper and Disc



Exploded View - Rear Brake Master Cylinder and Hose

Brakes

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.



Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to loss of motorcycle control and an accident could result if this warning is ignored.



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

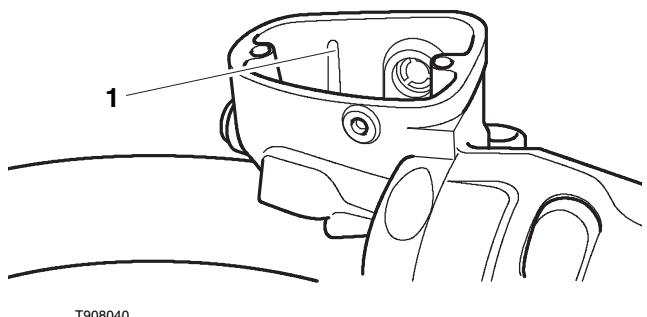
- With the reservoir level and upright, check the level of brake fluid visible at the front of the reservoir body. The fluid level must be kept above the lower level mark.



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.

- Top-up the fluid level to the upper level mark using only new DOT 4 fluid from a sealed container.



1. Upper level mark

- Once the fluid level is correct, wipe clean the rubber diaphragm and seat it correctly in the top of the reservoir. Fit the cap to the reservoir.

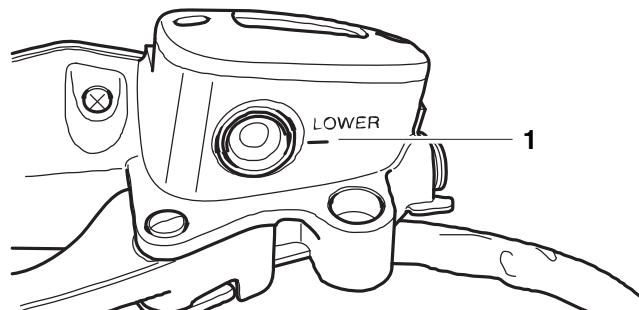
Rear brake

- With the reservoir level, check the brake fluid level. The fluid level must be kept between the upper and lower level marks.



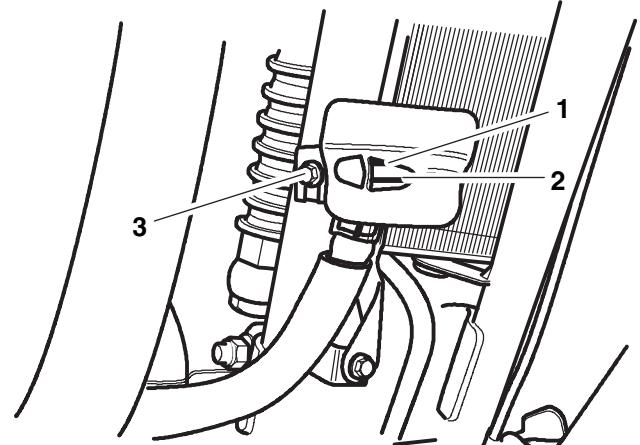
Warning

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. Lower level mark

- To adjust the fluid level, remove the reservoir cover.
- Remove the rubber diaphragm from the reservoir, taking care not to spill any fluid.



1. Upper level mark

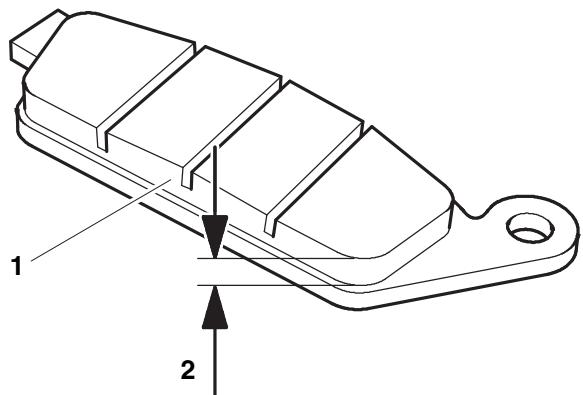
- Lower level mark
- Reservoir fixing

Brakes

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 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 **3 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.



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

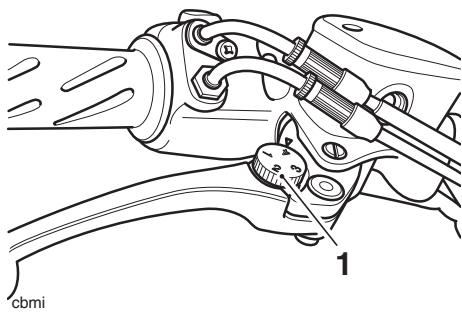
Front brake bleeding

! 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

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. 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.

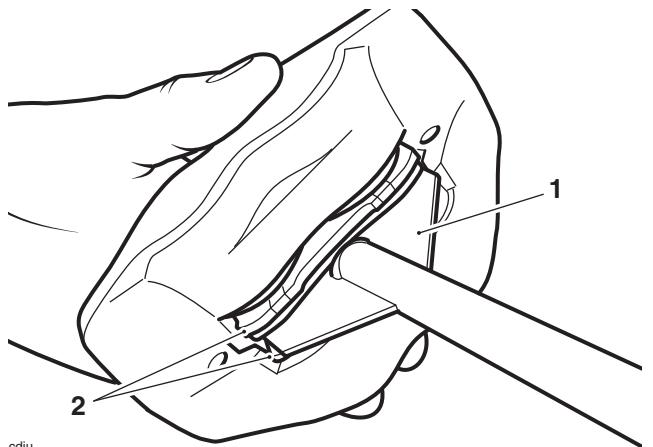
Note:

- **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.**
- 5. 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.

6. 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

7. Remove the rubber cap from the bleed nipple on the caliper.
8. 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.
9. Support the caliper so that the bleed nipple is uppermost then release the bleed nipple.

Brakes

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.**
- 10. Get an assistant to slowly pull the brake lever to the handlebar.
- 11. With the lever held fully against the handlebar, close the bleed nipple. Once the bleed nipple is closed, release the brake lever.
- 12. Repeat steps 10 to 12 until no more air appears in the bleed tube.
- 13. When all the air has been expelled from the system, hold the brake lever in and close the bleed nipple.
- 14. Remove the transparent bleed tube.
- 15. 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.

- 16. Secure the caliper to the front fork using the original fixings. Tighten the fixings to **28 Nm**.
- 17. Refit the transparent bleed tube and repeat steps 10 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.**
- 18. Remove the transparent bleed tube and tighten the bleed nipple to **6 Nm** then refit the rubber cap.
- 19. Fill the reservoir to the upper level with new DOT 4 fluid.



Warning

Use only DOT 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those DOT 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.

20. Repeat the brake bleeding procedure for the remaining front caliper (if fitted).
21. Wipe clean the rubber diaphragm and seat it correctly in the top of the reservoir. Refit the reservoir cap.
22. On models fitted with an adjustable brake lever, reset the brake lever adjuster to the original setting.
23. Check that the brake operates correctly.



Warning

It is dangerous to operate the motorcycle with defective brakes; 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. Release the reservoir from its mounting bracket and remove the reservoir cover. Whilst ensuring that the reservoir remains upright, remove the reservoir cover and diaphragm, taking care not to spill any fluid.
 2. Remove the dust cap from the rear brake caliper bleed nipple.
 3. Attach a transparent tube to the bleed nipple.
 4. 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.
 5. 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:

- If extensive bleeding fails to improve the feel of the brake pedal, it is likely that the master cylinder seals are worn.
- 10. When the brake operation is correct, disconnect the tube. Tighten the bleed nipple to **6 Nm** and refit the dust cap.
- 11. Fill the reservoir to the upper level with new DOT 4 fluid.



Warning

Use only DOT 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those DOT 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.

12. Wipe clean the rubber diaphragm and seat it correctly in the top of the reservoir.
13. Fit the cap to the reservoir and securely tighten.
14. Refit the reservoir cover.
15. Refit the reservoir to the mounting bracket and secure with the mounting screw. Tighten the screw to **3 Nm**.



Warning

It is dangerous to operate the motorcycle with defective brakes; 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.

Brakes

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:

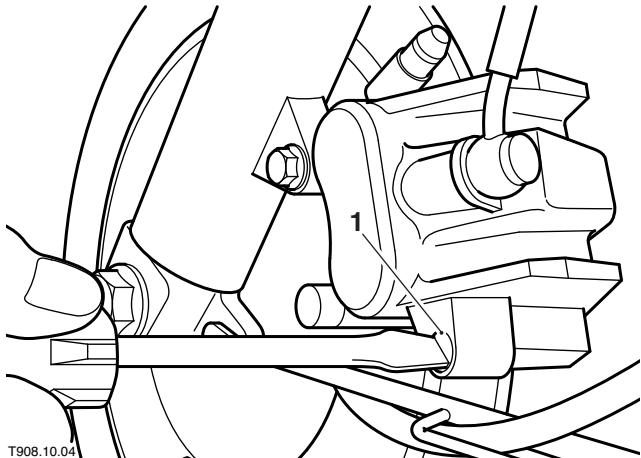
- **Read through the safety precautions before proceeding.**
- **If two calipers are fitted, replace both pads in the first caliper before replacing both pads in the second caliper.**

Removal

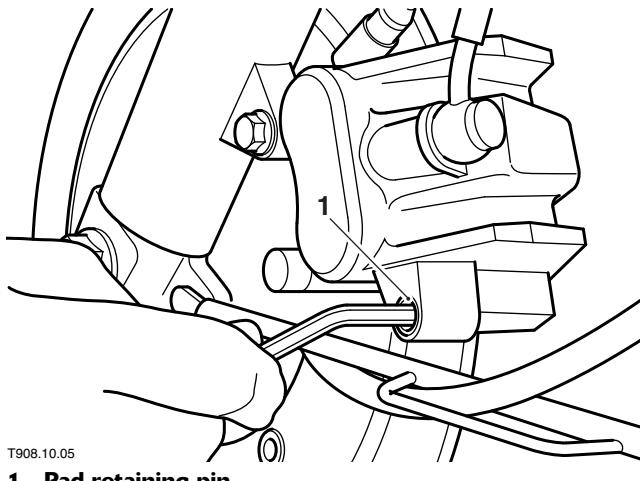
! Warning

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.



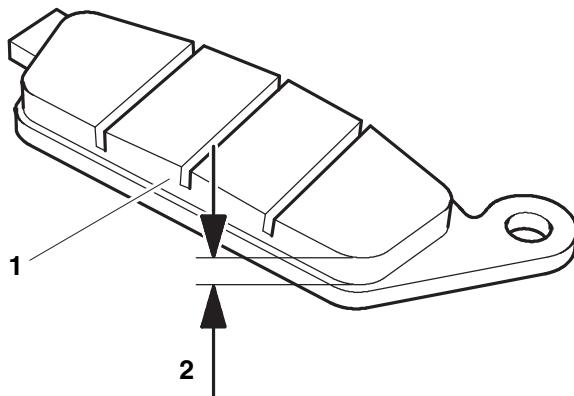
1. Pad retaining pin plug
2. Loosen the pad retaining pin.



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.



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 (see page 11-9).
- 10. Check the operation of the brake before riding the motorcycle.

Warning

It is dangerous to operate the motorcycle with defective brakes; 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.

Breaking-in New Brake Pads and Discs

After replacement brake discs and/or pads have been fitted to the motorcycle, we recommend a period of careful breaking-in that will optimise the performance and longevity of the discs and pads. The recommended distance for breaking-in new pads and discs is 200 miles (300 km).

After fitting new brake discs and/or pads avoid extreme braking, ride with caution and allow for greater braking distances during the breaking-in period.

Brakes

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.

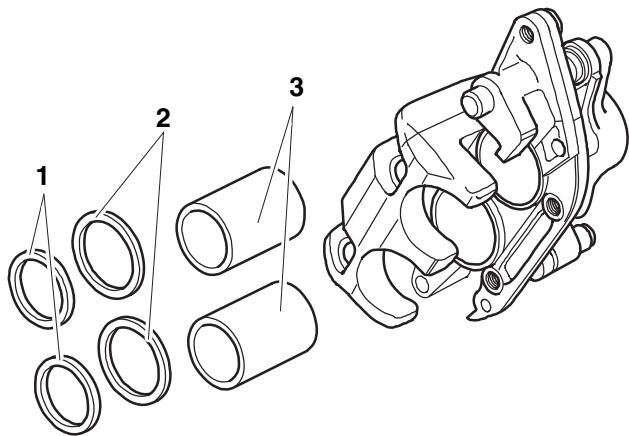
Overhaul

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.



Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to loss of motorcycle control and 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.



Warning

Never use mineral based grease (such as lithium or copper based greases) 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 and dust seals in the calipers and master cylinders. Damage caused by contact with mineral based grease may reduce braking efficiency resulting in an accident.

9. Lubricate the mounting bracket pins with silicone based grease (such as T2022021 supplied by Triumph) then reassemble the bracket and caliper. Ensure the pin gaiters are correctly located on both the bracket and caliper.

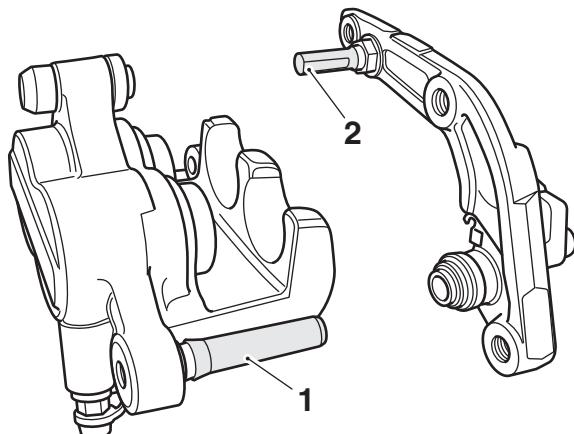
Installation

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 (see page 11-11).
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; 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.



1. Caliper sliding pin

2. Caliper bracket sliding pin

Brakes

Front Brake Master Cylinder

Note:

- **Read through the safety precautions before proceeding.**

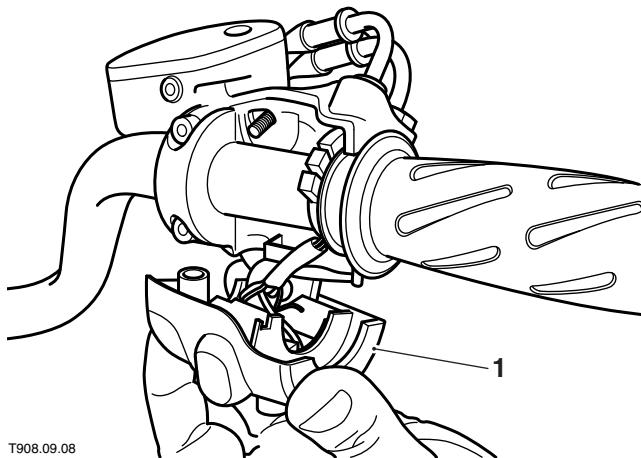
Removal



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.

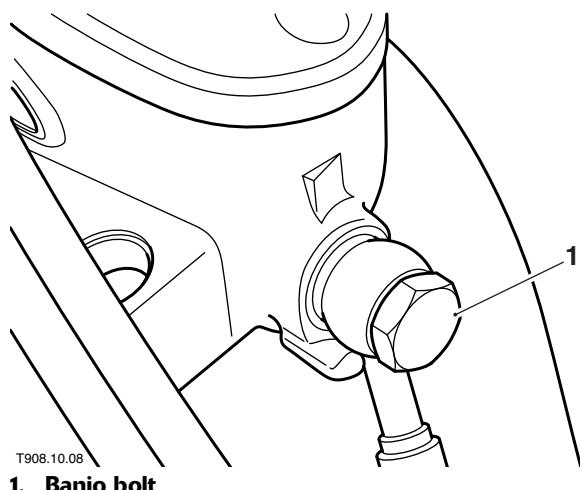
1. Remove the mirror (see page 16-24).
2. Undo the screws and free the right hand switchgear assembly from the master cylinder.



T908.09.08

1. Right hand switchgear assembly

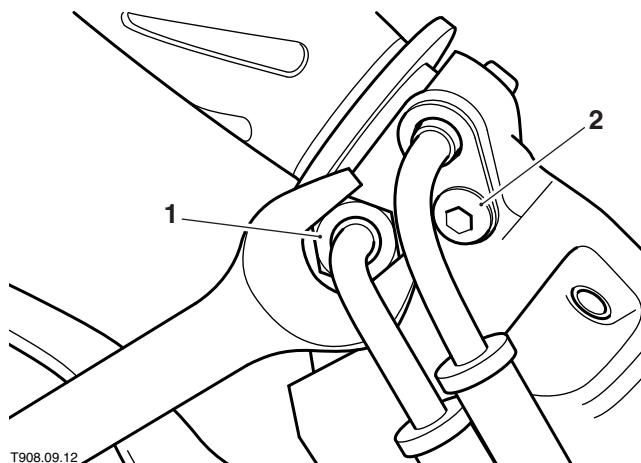
3. Disconnect the wiring from the front brake light switch.
4. Position a cloth beneath the hose to catch any spilt fluid then unscrew the banjo bolt and disconnect the brake hose from the master cylinder. Discard the sealing washers and keep the hose upright to minimise fluid loss.



T908.10.08

1. Banjo bolt

5. Slacken the reservoir cover screws.
6. Slacken the nut and screw securing the throttle cables to the master cylinder.



- T908.09.12
1. Closing cable nut
2. Opening cable screw

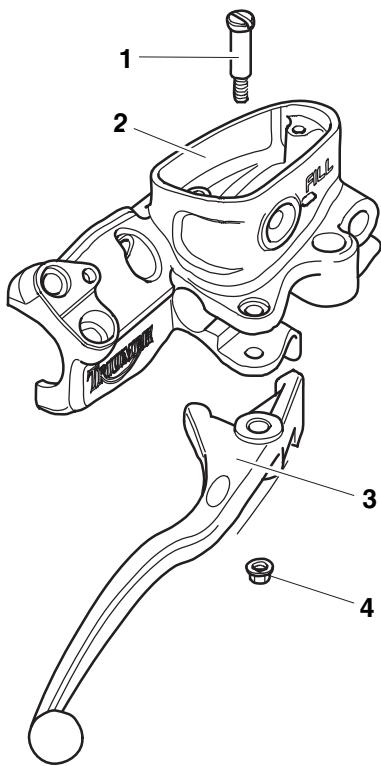
7. Undo the screws and remove the master cylinder mounting clamp.
8. Free the throttle cables from the twist grip and free the master cylinder from the handlebars.

Note:

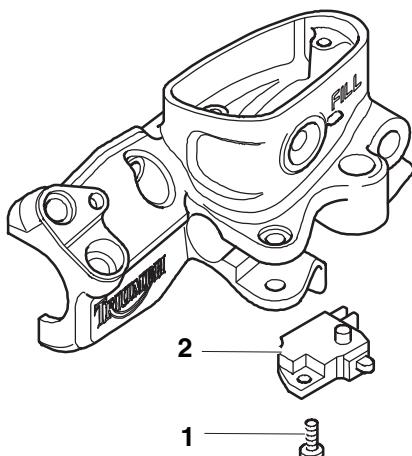
- **Keep the master cylinder upright to prevent fluid spillage.**
- **If necessary, free the throttle cables from the carburettor/throttle body bracket to gain the necessary free play to allow them to be disconnected from the twist grip.**
- 9. Remove the screw and slacken the nut then detach the throttle 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

- Unscrew the lock nut then unscrew the pivot bolt and remove the brake lever.



- Pivot bolt**
- Master cylinder**
- Brake lever**
- Lock nut**
- Undo the screw and remove the brake light switch.



- Screw**
- Brake light switch**
- Remove the boot from the end of the master cylinder bore.

- Remove the circlip then withdraw the piston assembly and spring, noting the fitted position of all parts.
- 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.
- 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.

Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

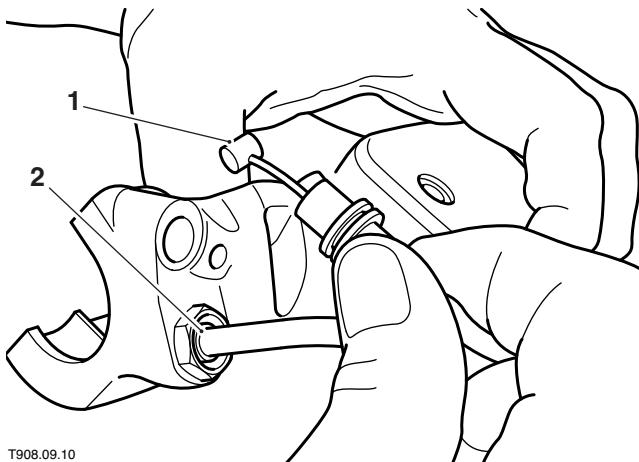
A dangerous riding condition leading to loss of motorcycle control and an accident could result if this warning is ignored.

- Ensure all components are clean and dry.
- Lubricate the new piston assembly and the cylinder bore with clean DOT 4 brake fluid.
- Fit the new spring ensuring its tapered end is facing the piston assembly.
- 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.
- Secure the piston assembly in position with the circlip, ensuring it is correctly located in the cylinder groove.
- 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.
- Refit the brake light switch.
- Lubricate the brake lever pivot with brake grease and fit the lever. Insert the pivot bolt and tighten to **1 Nm** then fit the lock nut to the bolt and tighten it to **6 Nm**.

Brakes

Installation

- Fit the throttle cables to the master cylinder, tightening the retaining screw/nut securely.

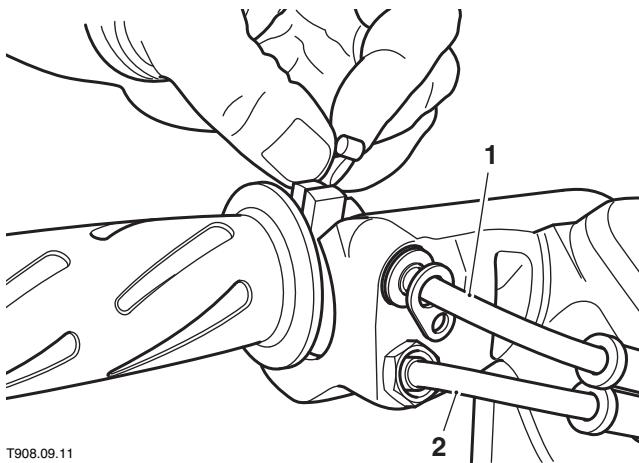


T908.09.10

1. Opening cable

2. Closing cable

- Connect the cables to the twist grip then seat the master cylinder on the handlebars.

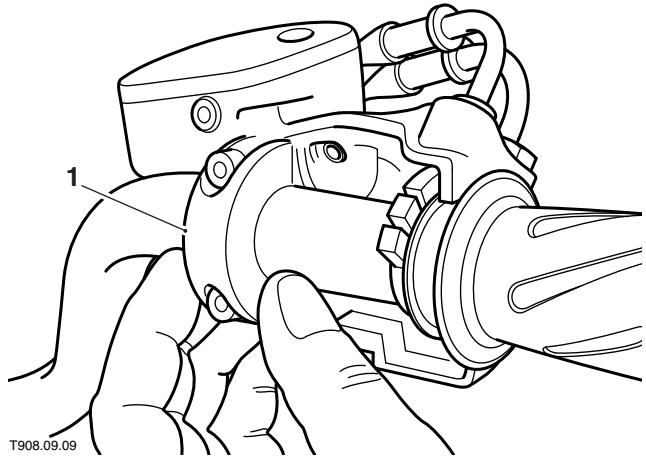


T908.09.11

1. Closing cable

2. Opening cable

- Fit the mounting clamp and bolts. Align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **12 Nm**.



T908.09.09

1. Master cylinder mounting clamp

- Refit the switchgear assembly to the master cylinder, tightening the screws to **2.5 Nm**.

Note:

- Tuck the indicator wiring and connector into the recess in the front half of the switchgear.**
- 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**.
- Fill the reservoir with clean DOT 4 brake fluid then bleed the front brake (see page 11-11).
- Check the throttle cable operation and adjust the cable free play (see page 10A-18 for carburettor models or page 10B-89 for fuel injected models).



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; 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

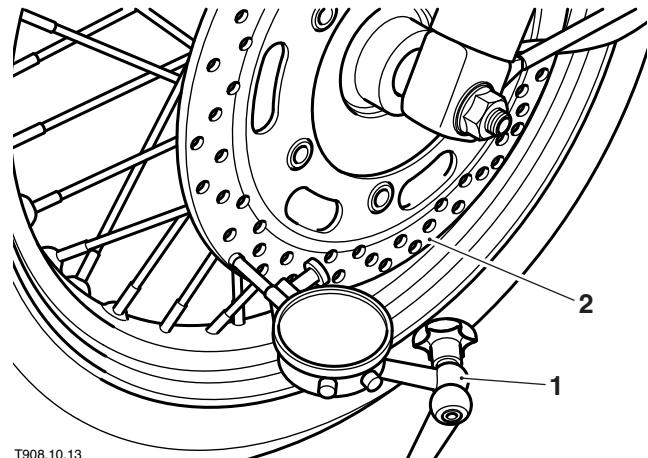
Note:

- 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.

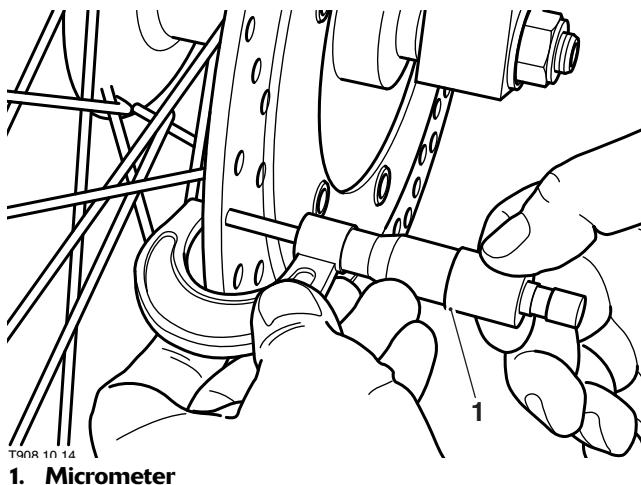


Brakes

Disc Run-out

Standard	Less than 0.15 mm
Service limit	0.30 mm

- Using a micrometer, measure the disc thickness at several points.



1. Micrometer

Disc Thickness

Standard	5.50 mm
Service limit	5.00 mm

- If the disc is warped or worn beyond the specified service limit, it must be renewed.
- Repeat for the second disc (if applicable).

Note:

- If two front brake discs are fitted, always replace both discs.**
- If two front discs are fitted, the left and right hand discs have a direction arrow on them. Observe the direction arrow on each disc, pointing in the forward direction of rotation when fitted to the motorcycle.**
- Always replace all the front brake pads when replacing discs.**

Removal

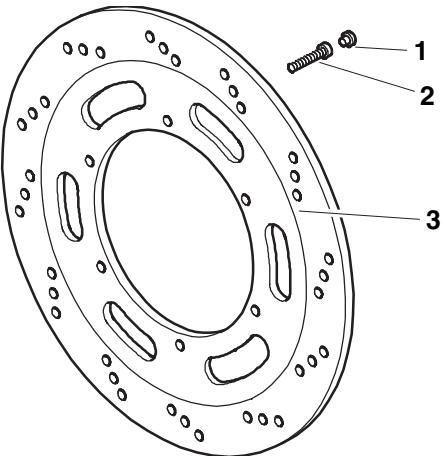
- Remove the front wheel (see page 15-17 for models with spoked wheels and page 15-20 for models with cast wheels).



Caution

Never allow the weight of the wheel to rest on the disc as this could cause the disc to warp.

- Remove the trim caps from the disc retaining bolts.



- Trim cap**
- Bolt**
- Disc**
- Evenly and progressively slacken the retaining bolts then remove the disc from the wheel. Discard the bolts.
- Repeat for the second disc where fitted.

Installation

- Ensure the disc and wheel surfaces are clean.
- Fit the disc ensuring its marked surface is facing outwards and the direction arrow is as noted for removal.
- Fit the new retaining bolts and tighten them evenly and progressively to **22 Nm**.
- Fit a trim cap to each retaining bolt.
- Repeat for the second disc where fitted.
- Clean and degrease the disc(s) then refit the front wheel (see page 15-18 for models with spoked wheels and page 15-21 for models with cast wheels).

Breaking-in New Brake Pads and Discs

After replacement brake discs and/or pads have been fitted to the motorcycle, we recommend a period of careful breaking-in that will optimise the performance and longevity of the discs and pads. The recommended distance for breaking-in new pads and discs is 200 miles (300 km).

After fitting new brake discs and/or pads avoid extreme braking, ride with caution and allow for greater braking distances during the breaking-in period.

Rear Brake Pads

Note:

- Read through the safety precautions before proceeding.**

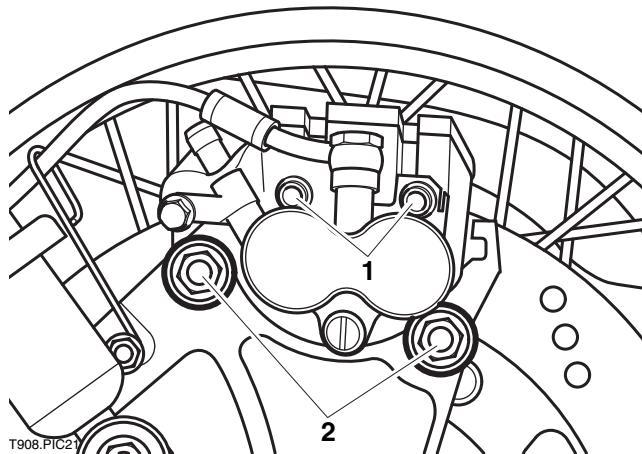
Removal



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. Loosen the pad retaining pins.



1. Pad retaining pins

2. Caliper mounting bolts

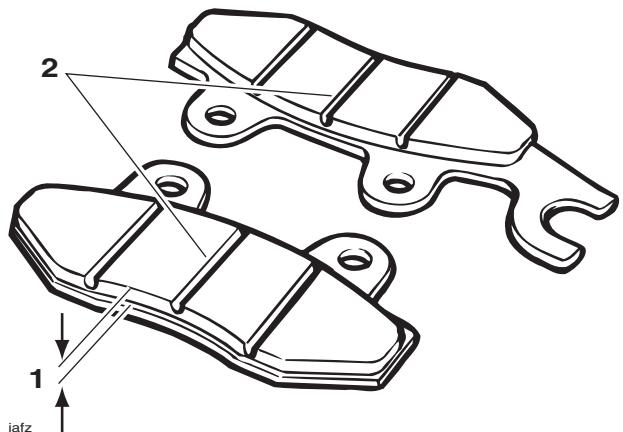
2. Slacken and remove the caliper mounting bolts and slide the caliper off the disc.

Note:

- Release the clip securing the brake hose to the caliper carrier which will allow the caliper to be removed from the disc.**
- 3. 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.

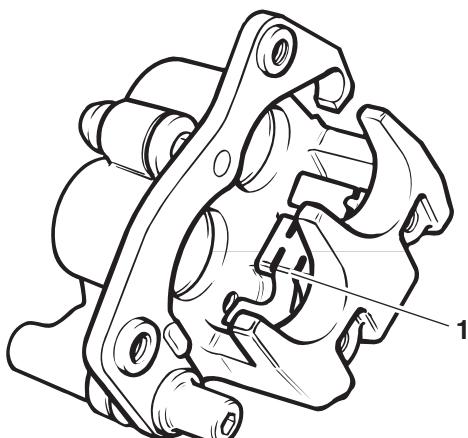


Warning

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.

Brakes

- Fit the anti-rattle spring to the caliper.



gakw

1. Anti-rattle spring

- 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.
- Slide the caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the mounting bolts to **40 Nm**.
- Tighten the pad retaining pins to **18 Nm**.
- Refit the hose clip to the caliper carrier, and tighten its fixing to **9 Nm**.
- Apply the rear brake pedal several times to force the pads back into contact with the disc.
- Check the rear brake fluid level and adjust if necessary.
- 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; 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.

Breaking-in New Brake Pads and Discs

After replacement brake discs and/or pads have been fitted to the motorcycle, we recommend a period of careful breaking-in that will optimise the performance and longevity of the discs and pads. The recommended distance for breaking-in new pads and discs is 200 miles (300 km).

After fitting new brake discs and/or pads avoid extreme braking, ride with caution and allow for greater braking distances during the breaking-in period.

Rear Brake Caliper

Note:

- Read through the safety precautions before proceeding.**

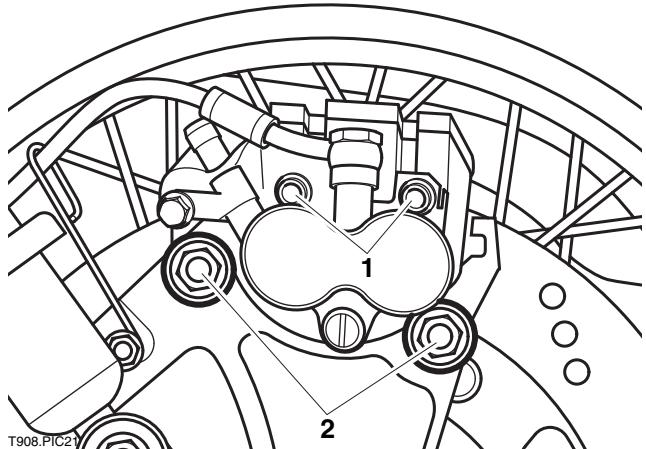
Removal



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.

- 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.



1. Pad retaining pins

2. Caliper mounting bolts

- If the caliper is to be overhauled, remove the brake pads (see page 11-23) and remove the caliper from the motorcycle.
- 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.



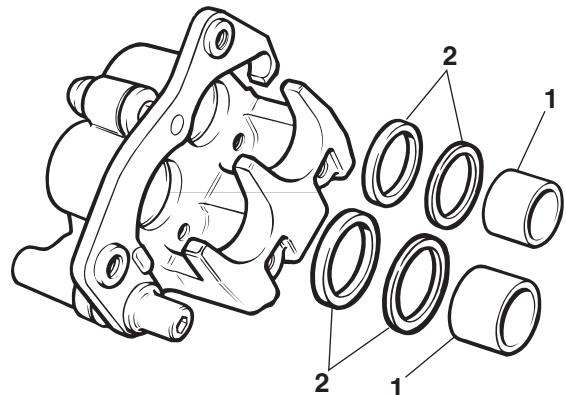
Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to loss of motorcycle control and 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.



gaec

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.



Warning

Never use mineral based grease (such as lithium or copper based greases) 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 and dust seals in the calipers and master cylinders. Damage caused by contact with mineral based grease may reduce braking efficiency resulting in an accident.

9. Lubricate the mounting bracket pins with silicone based grease (such as T2022021 supplied by Triumph) then reassemble the bracket and caliper. Ensure the pin gaiters are correctly located on both the bracket and caliper.

Brakes

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 (see page 11-12).
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; 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 Master Cylinder

Note:

- **Read through the safety precautions before proceeding.**

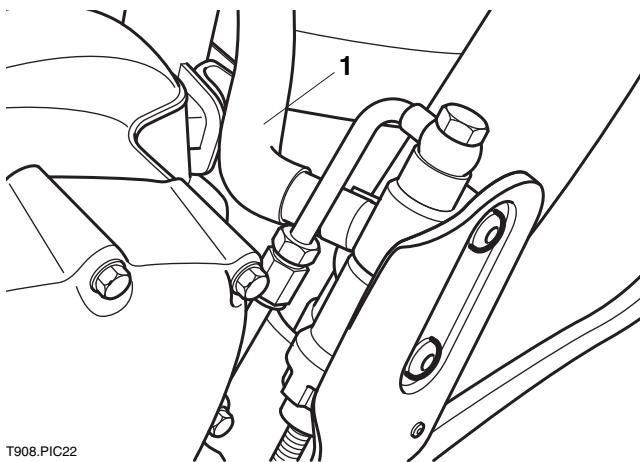
Removal



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. Disconnect the reservoir hose from the master cylinder and drain the brake fluid into a container.



T908.PIC22

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.



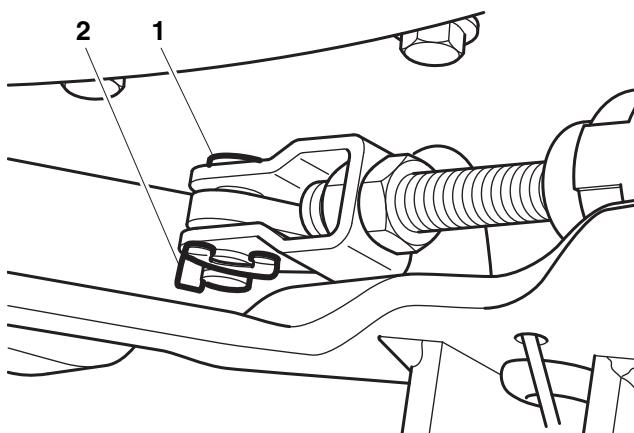
Warning

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.

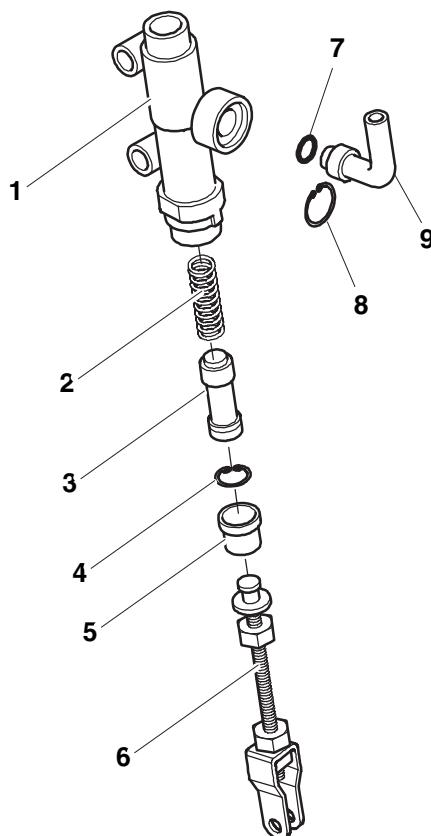
3. Slide off the clip and remove the clevis pin securing the master cylinder pushrod to the pedal.



1. Clevis pin
2. Clip

4. Release the fixings and remove the right hand control plate and footrest/footboard assembly.
5. 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.

Brakes



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.



Warning

Before installation, all internal brake components should be cleaned and lubricated with clean new DOT 4 brake fluid.

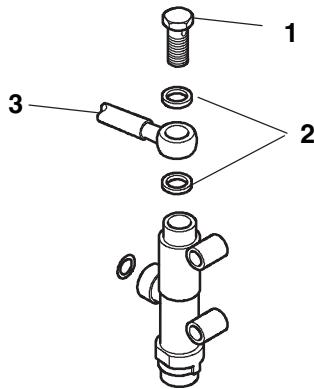
Never use solvents, petrol (gasoline), engine oil, or any other petroleum distillate on internal brake components as this will cause deterioration of the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to loss of motorcycle 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

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 lock nuts and adjust the clevis position. Once the length is correct, tighten the lock nuts to **18 Nm**.
2. Fit the master cylinder and tighten its mounting bolts to **15 Nm**.
3. Refit the right hand control plate and footrest/footboard assembly. Tighten the fixings to **15 Nm**.
4. 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.
5. 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.

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 (see page 11-12).
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; 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

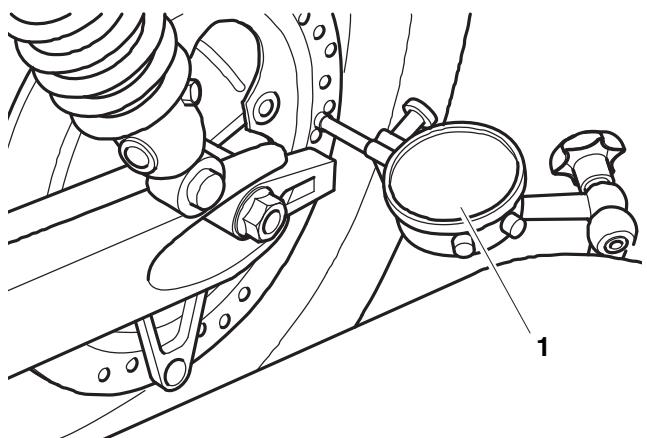
Inspection

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.

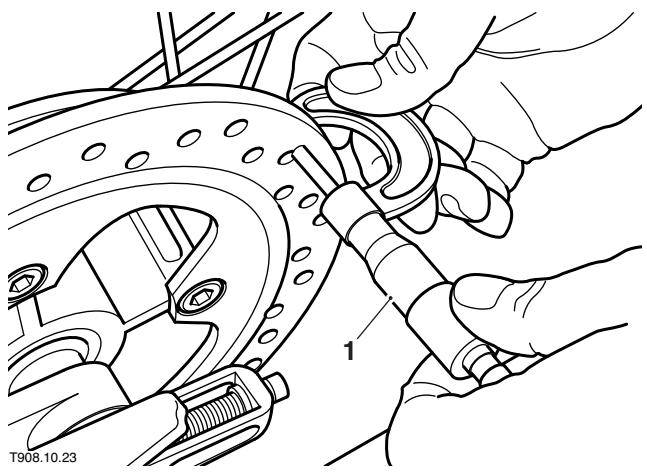


1. Dial gauge

Disc runout

Standard	Less than 0.15 mm
Service limit	0.30 mm

2. Using a micrometer, measure the disc thickness at several points.



1. Micrometer

Brakes

Disc thickness

Standard	6.00 mm
Service limit	5.50 mm

3. If the disc is warped or worn beyond the specified service limit, it must be renewed.

Removal

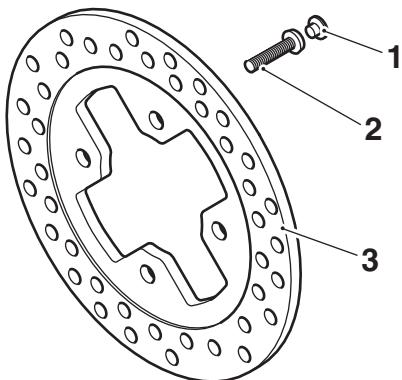
1. Remove the rear wheel (see page 15-22).



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 (see page 15-23).

Note:

- **If a new disc has been fitted, ensure new brake pads are also installed.**

Breaking-in New Brake Pads and Discs

After replacement brake discs and/or pads have been fitted to the motorcycle, we recommend a period of careful breaking-in that will optimise the performance and longevity of the discs and pads. The recommended distance for breaking-in new pads and discs is 200 miles (300 km).

After fitting new brake discs and/or pads avoid extreme braking, ride with caution and allow for greater braking distances during the breaking-in period.

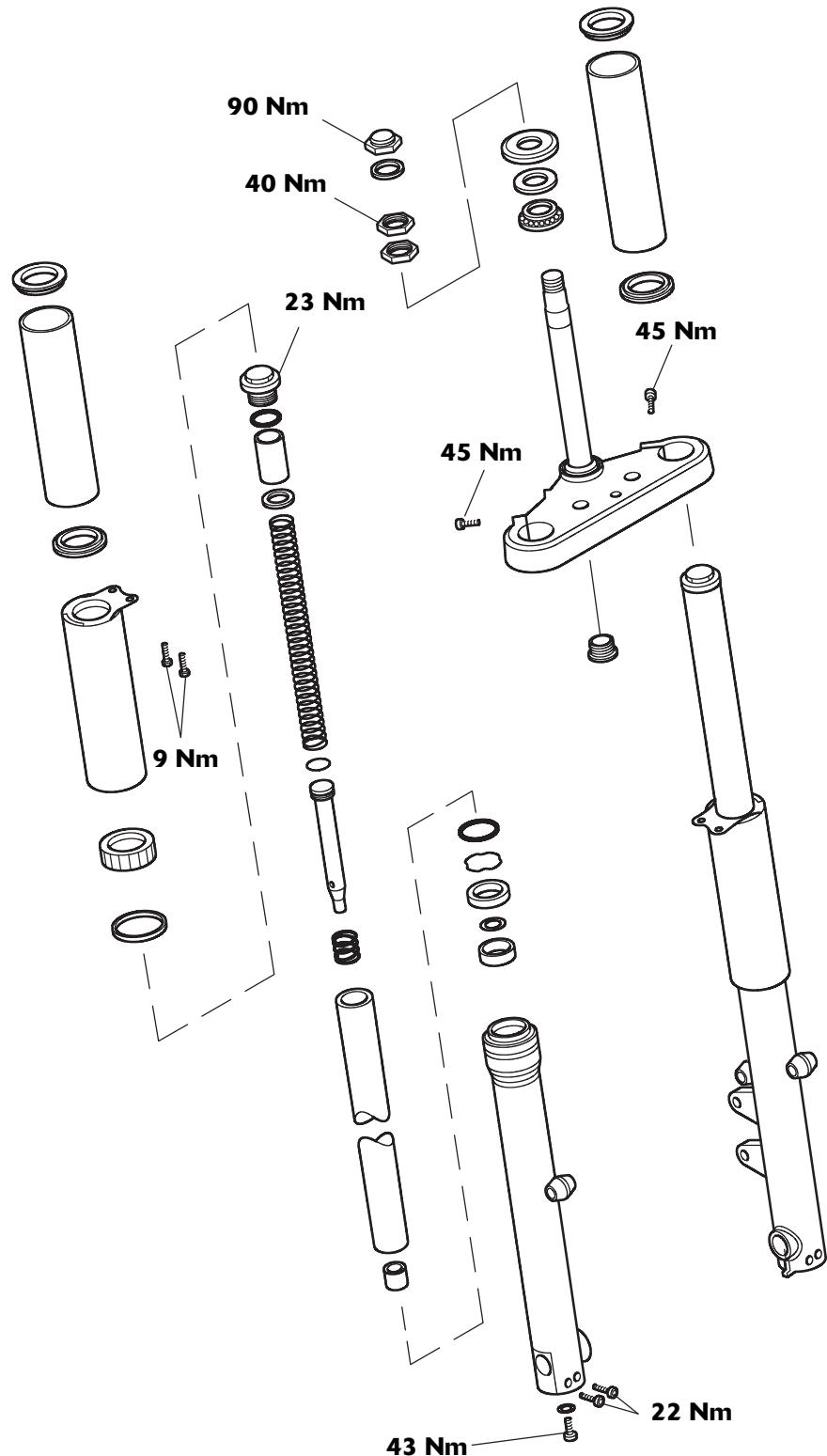
12 Front Suspension & Steering

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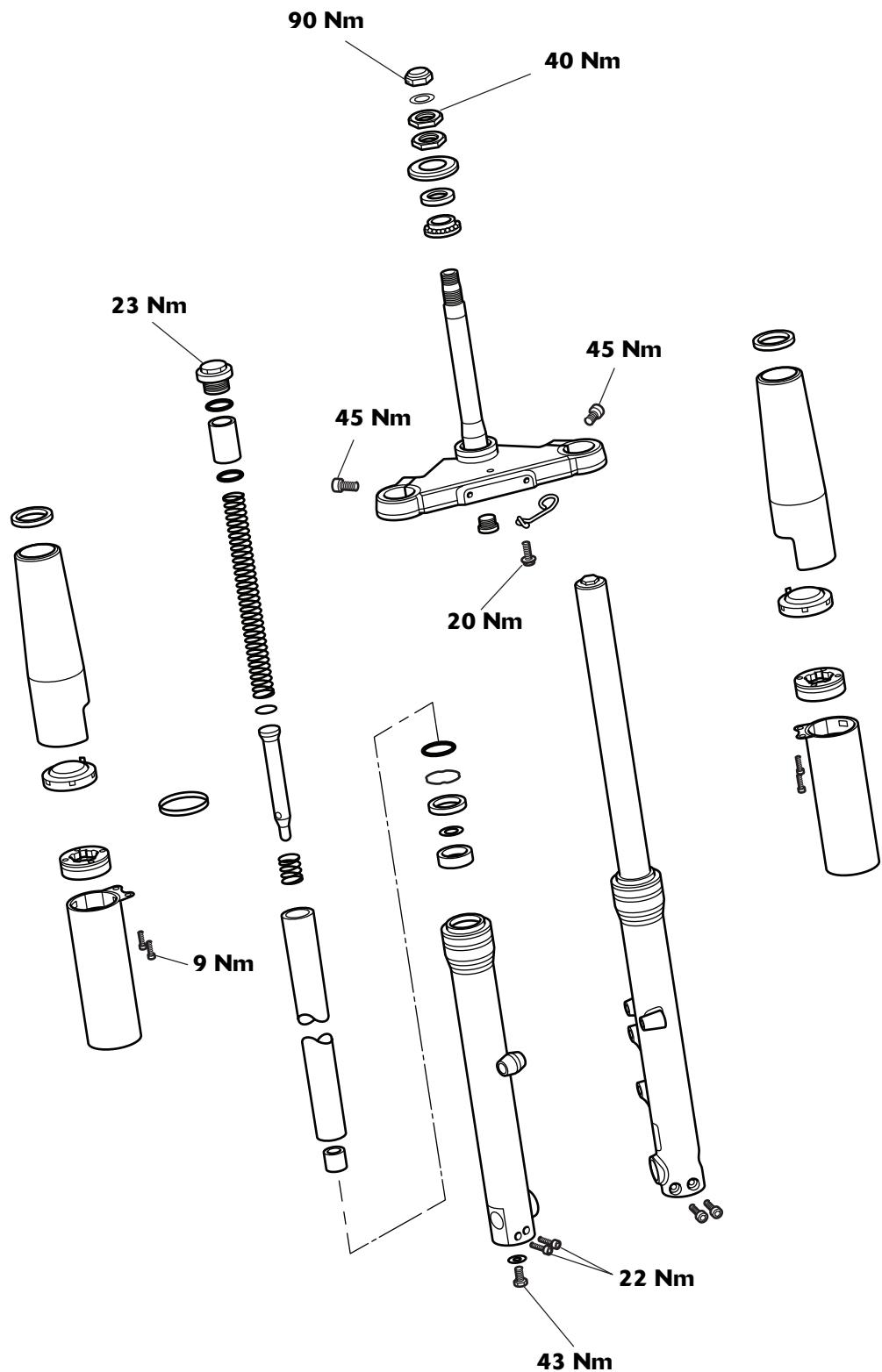
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Front Suspension & Steering

Exploded View - Front Fork - America up to VIN 468389 & Speedmaster up to VIN 469049

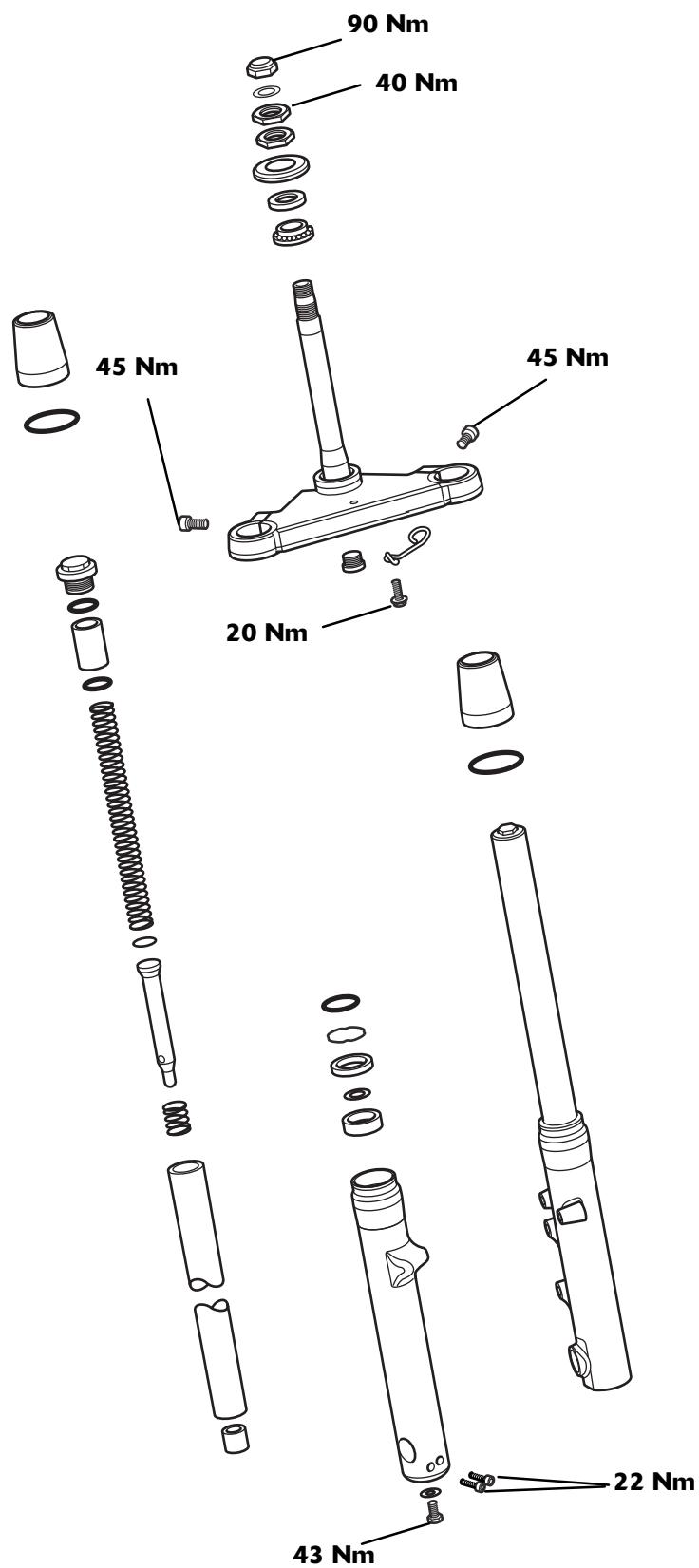


Exploded View - Front Fork - America and America LT from VIN 468390

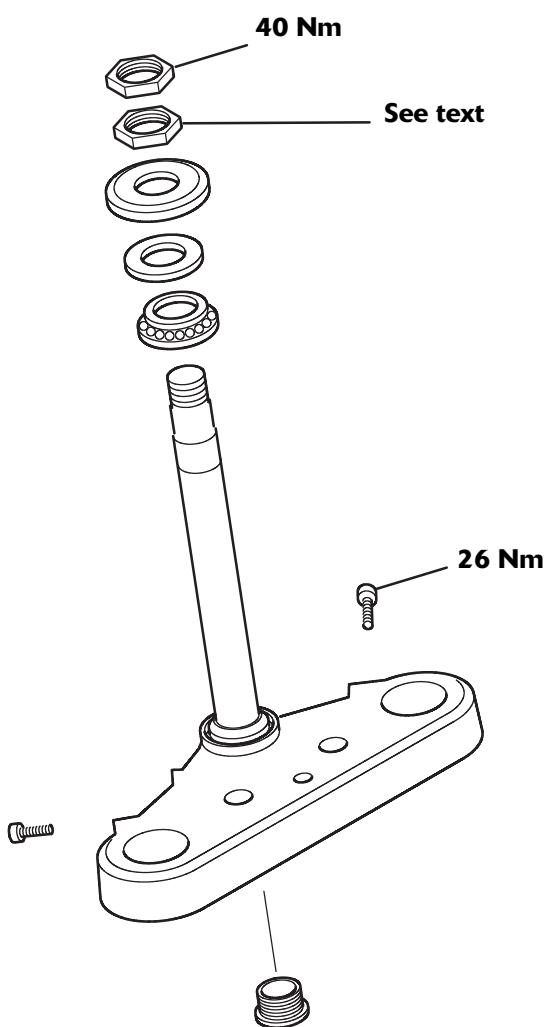
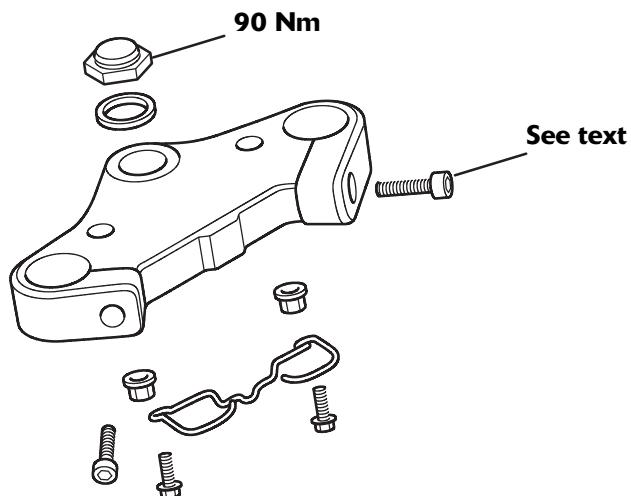


Front Suspension & Steering

Exploded View - Front Fork - Speedmaster from VIN 469050

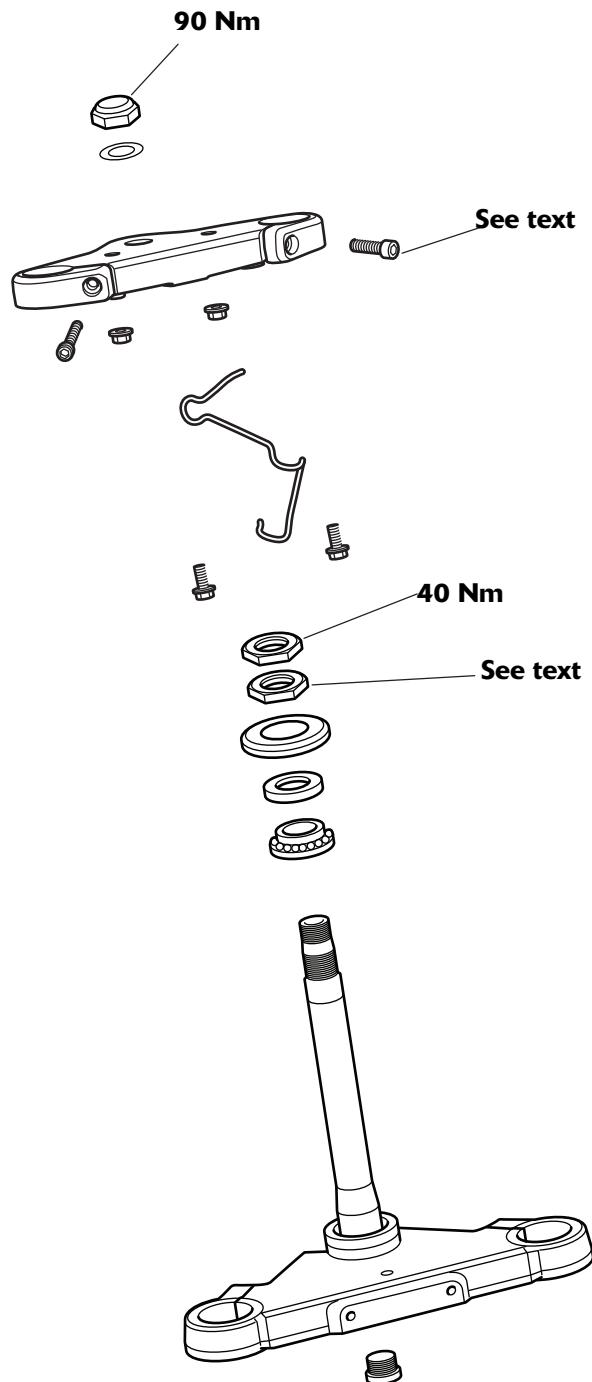


Exploded View - Top and Bottom Yokes/Steering Head Bearings - America up to VIN 468389 & Speedmaster up to VIN 469049

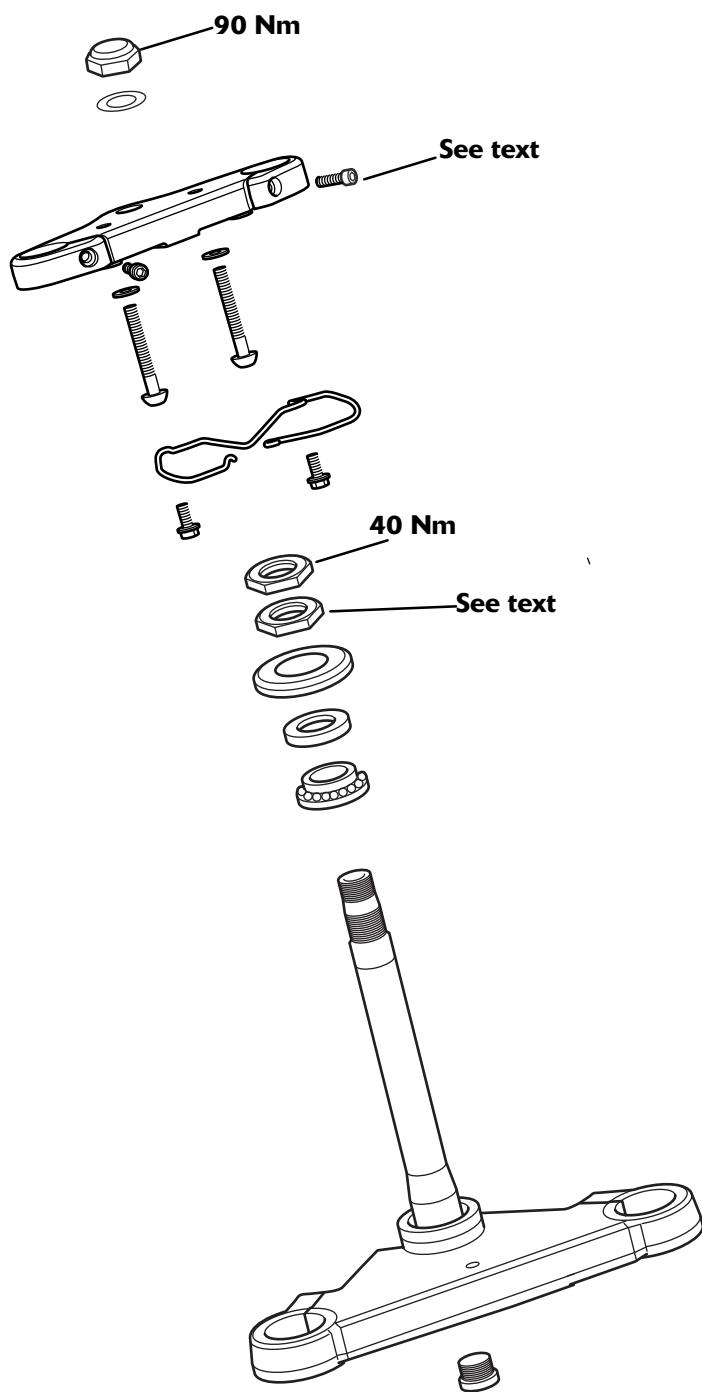


Front Suspension & Steering

Exploded View - Top and Bottom Yokes/Steering Head Bearings - America and America LT from VIN 468390



Exploded View - Top and Bottom Yokes/Steering Head Bearings - Speedmaster from VIN 469050



Front Suspension & Steering

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

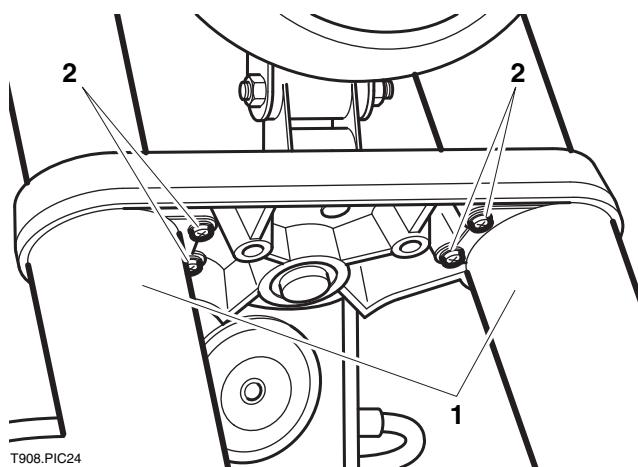
Removal



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.

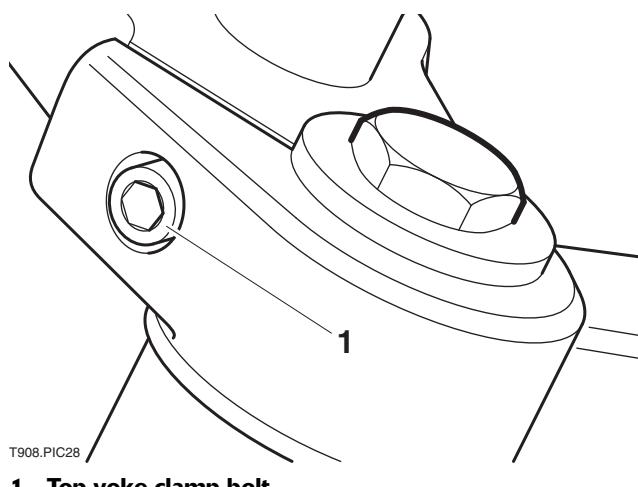
1. **America LT only:** Remove the windscreen (see page 16-26).
2. Remove the front wheel (see page 15-17 for models with spoked wheels and page 15-20 for models with cast wheels).
3. Remove the front mudguard (see page 16-17).
4. Release the lower fork shrouds from the under-side of the bottom yoke. Protect the mudguard mountings with tape then allow the shrouds to rest on the mudguard mounting lugs.



1. Fork shrouds

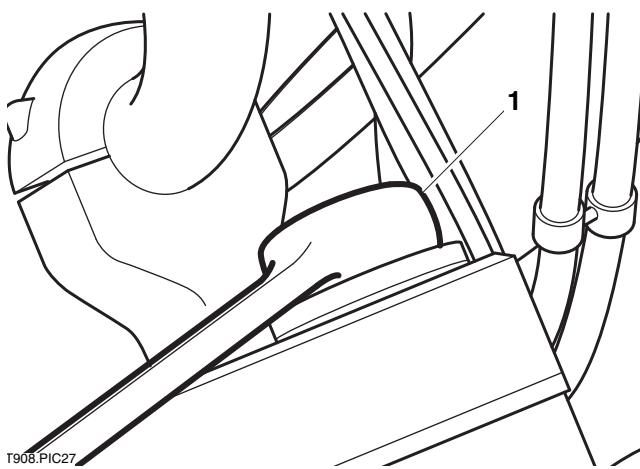
2. Fork shroud fixings

5. Slacken the top yoke clamp bolt.



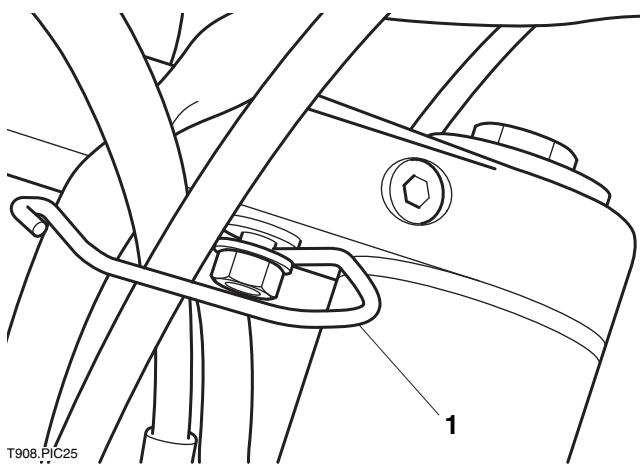
1. Top yoke clamp bolt

- If the fork is to be dismantled, loosen the fork's top cap.



1. Top cap

- 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.



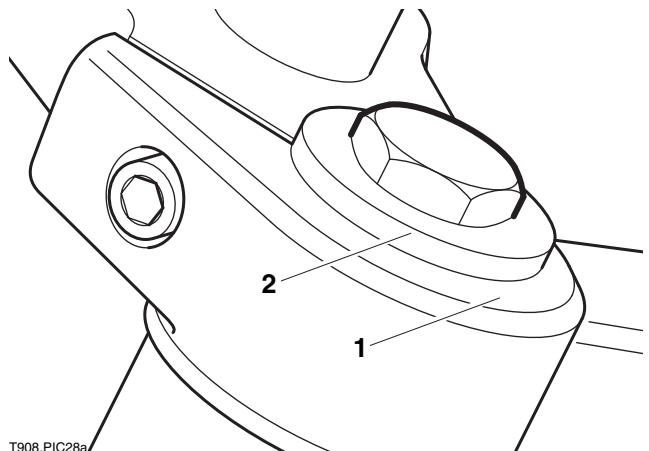
1. Cable guide

Note:

- The upper fork shrouds will remain situated between the upper and lower yokes.**
- Slide the lower fork shrouds up the forks and withdraw from the top.

Installation

- Position the lower fork shrouds over the forks resting them on the mudguard mounting lugs.
- Slide the forks into the yokes ensuring the upper fork shrouds remain in position.
- 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

- If the fork has been dismantled, tighten the top cap to **23 Nm**.
- Tighten the top yoke clamp bolt to:
For America up to VIN 468389 and Speedmaster up to VIN 469049 **26 Nm**.
For America and America LT from VIN 468390 and Speedmaster from VIN 469050 **24 Nm**.
- Refit the front mudguard (see page 16-18).
- Install the front wheel (see page 15-18 for models with spoked wheels and page 15-21 for models with cast wheels).
- America LT only:** Refit the windscreens (see page 16-26).

Front Suspension & Steering

Fork Oil Change

Oil draining

1. Remove the fork assembly (see page 12-8).
2. Secure the fork inner tube upright in a soft jawed vice.



Caution

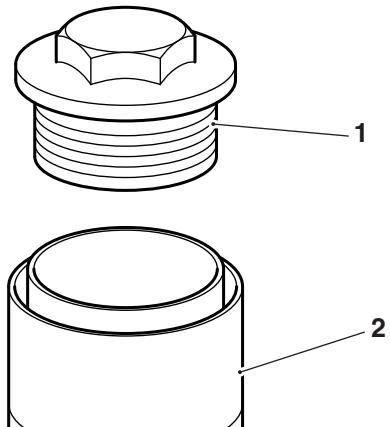
When securing the fork in a vice, take great care not to overtighten the vice as this will cause the fork tube to distort beyond repair.

3. Carefully unscrew the top cap from the inner tube.



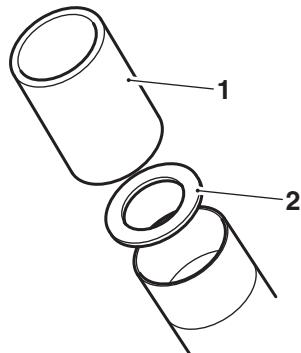
Warning

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.



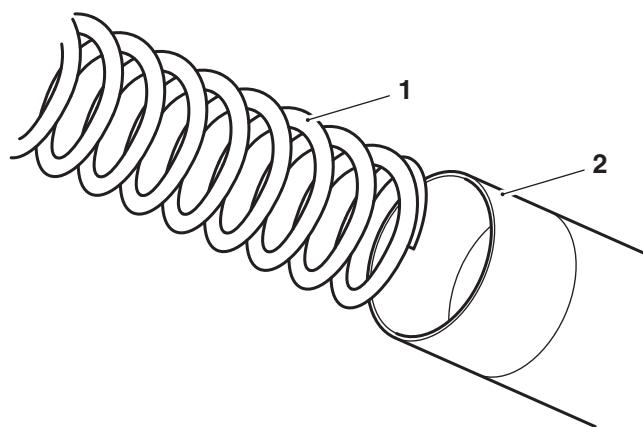
1. Top cap
2. Fork tube

4. Remove the spacer and spring seat.



T908.11.11

1. Spacer
 2. Spring seat
5. Lift out the spring.



T908.11.07

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

America up to VIN 468389 and Speedmaster up to VIN 469049

Fork oil type	Kayaba G10
Fork oil capacity	552 cc
Fork oil level (fork fully compressed)	161 mm below inner tube upper surface.

America and America LT from VIN 468390

Fork oil type	Kayaba G10
Fork oil capacity	561 cc
Fork oil level (fork fully compressed)	135 mm below inner tube upper surface.

Speedmaster from VIN 469050

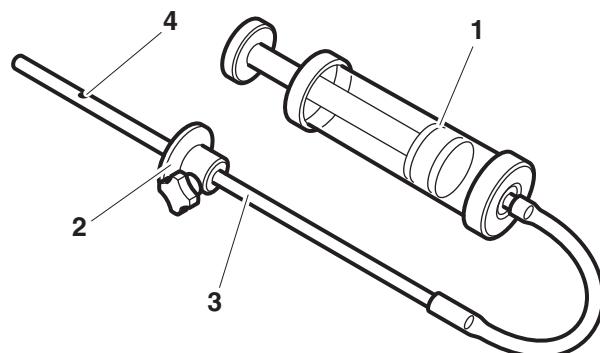
Fork oil type	Kayaba G10
Fork oil capacity	555 cc
Fork oil level (fork fully compressed)	135 mm below inner tube upper surface.



Warning

Any variation from the figures quoted above could result in an unsafe riding condition leading to loss of control and an accident.

1. 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.



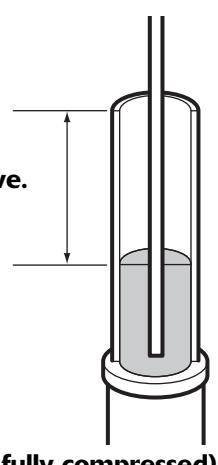
ccha

1. **Tool 3880160-T0301**
2. **Adjuster plate**
3. **Scale area**
4. **Hole (zero position)**

Note:

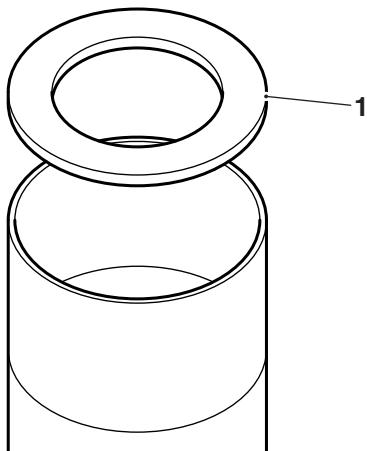
- **Zero level on the tool is set at the small exit hole in the side of the scale tube, NOT AT THE END TIP. Do not attempt to block this side hole as this will cause the final fluid level to be incorrect.**
- 4. Insert the scale end of the tool into the fork inner tube.
- 5. Hold the tool adjuster plate 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.

For the measurement, refer to the tables above.



Front Suspension & Steering

- Fit the spring seat and spacer.



T908.11.11

1. Spring seat

- 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.

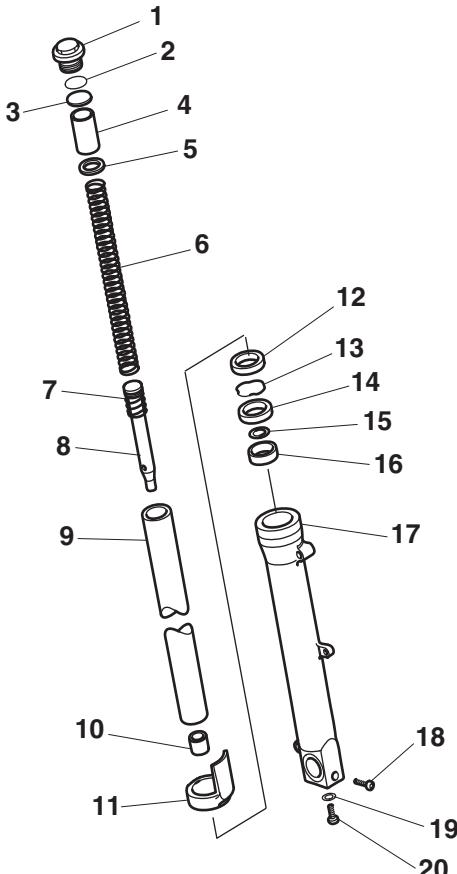
- Refit the fork (see page 12-9) and tighten the top cap to **23 Nm**.

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

- Top cap
- O-ring
- Disc washer
- Spacer
- Spring seat
- Spring
- Rebound spring
- Damper rod
- Inner tube
- Damper rod seat
- Fork protector (where fitted)
- Dust seal
- Circlip
- Oil seal
- Washer
- Bush
- Outer tube
- Spindle clamp bolt (where fitted)
- Sealing washer
- Damper rod bolt

1. Remove the fork assembly (see page 12-8).
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 page 12-10).
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.

Assembly



Warning

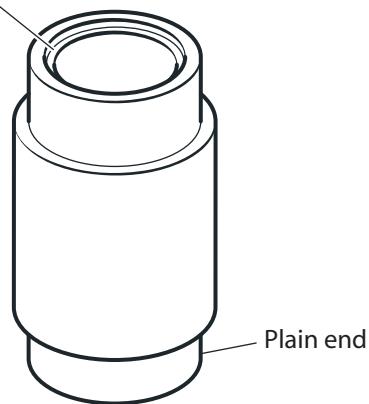
The front forks comprise many precision machined parts. Total cleanliness must be observed at all times and, assembly must take place in a dirt/dust-free environment.

Dirt ingress may cause damage to the fork parts, leading to incorrect operation, instability, loss of control or an accident.

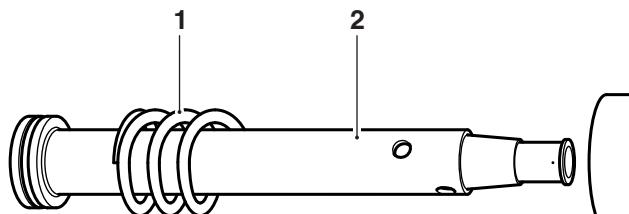
Note:

- 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.

Chamfered end (with internal recess)



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.

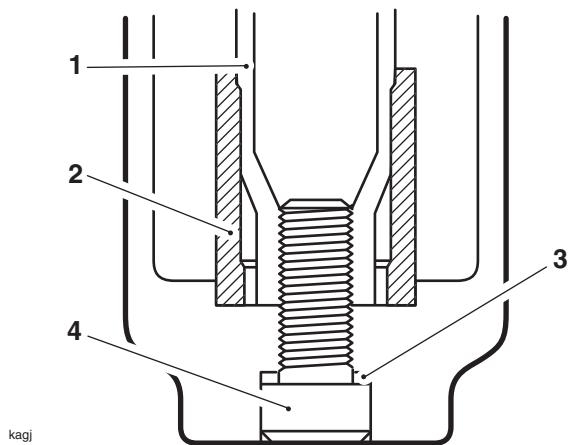


T908.11.13

1. Rebound spring
2. Damper rod

Front Suspension & Steering

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 (ThreeBond 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 **43 Nm**.



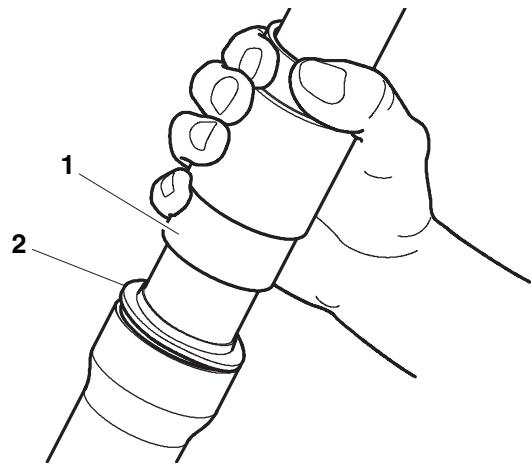
- 1. Damper rod**
- 2. Seat**
- 3. Sealing washer**
- 4. Bolt**

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.

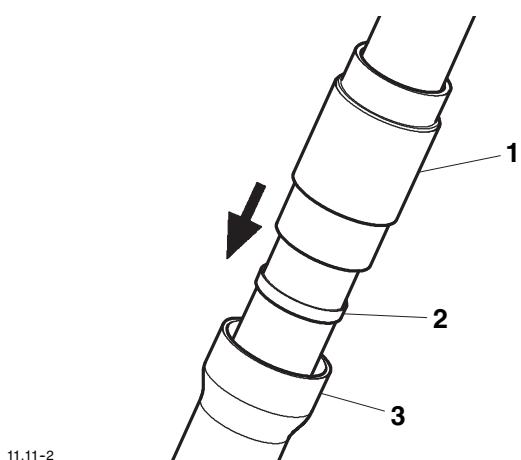
Note:

- **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.**

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 page 12-11).



- 11.11-3
1. Tool 3880080-T0301
2. Dust seal



- 11.11-2
1. Tool 3880080-T0301
2. Top bush
3. Outer tube

Steering Head Bearing Check and Adjustment

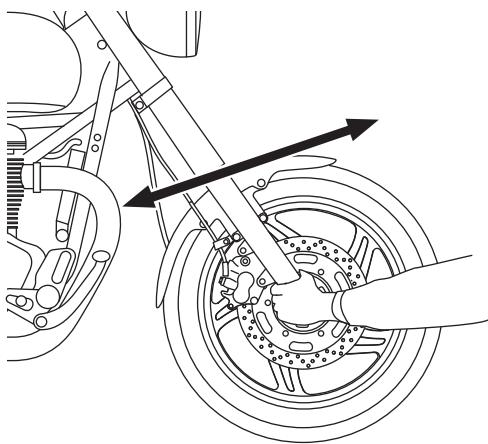


Warning

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 over-tightened).
3. Hold the lower end of the front forks and try to move them forward and backward to check for signs of free play in the bearings (bearings insufficiently tightened or worn).

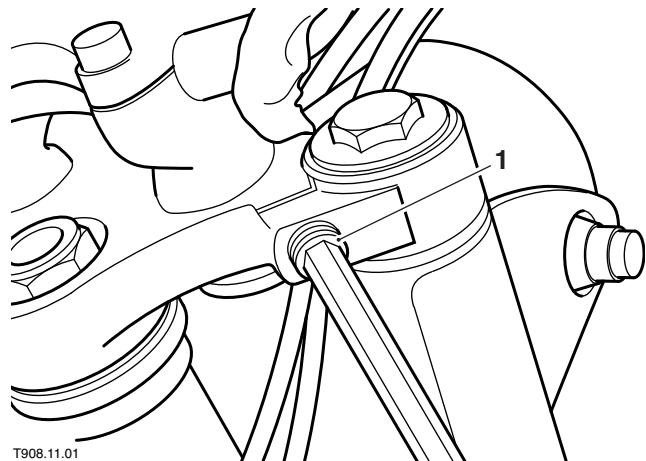


**Checking For Free Play In
Steering Head Bearings**

4. Adjust as described below then lower the motorcycle to the ground.

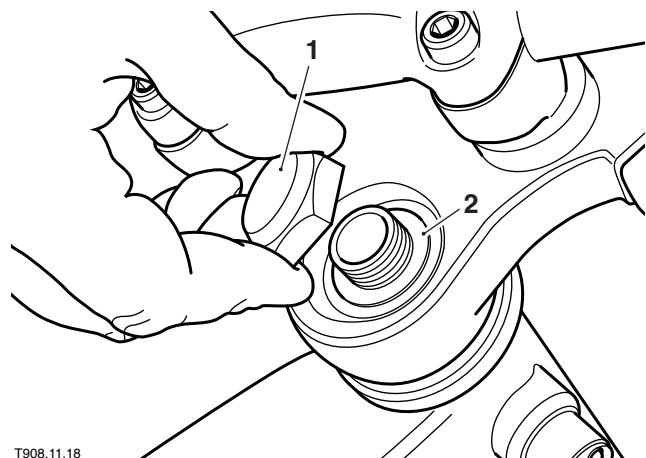
Adjustment

1. **America LT only:** Remove the windscreens (see page 16-26).
2. Slacken the top yoke clamp bolts.



1. Top yoke clamp 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 lock nut and adjuster nut.



T908.11.18

1. Top nut

2. Washer

4. Slacken the lock nut and adjuster nut.
5. Adjust the bearing free play as follows:
 - Ensure that the threaded part of the steering stem is free from grease.
 - 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 to **3 Nm**.

Front Suspension & Steering



Warning

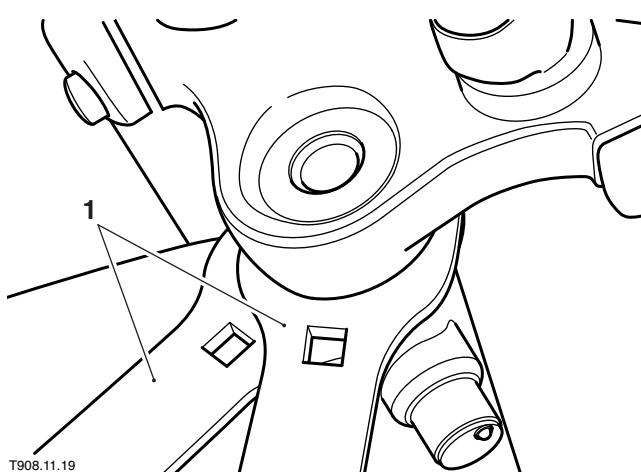
It is essential that the adjuster nut is not over-tightened. If the adjuster is over-tightened it will cause a pre-load on the steering head bearings. This will introduce tight steering which will lead to premature bearing wear and could cause loss of motorcycle control and an accident.

Note:

- **Correct adjustment is attained when the bearing play is eliminated without preloading the bearings.**
- 6. With the bearing free play correctly set, hold the adjuster nut stationary then tighten the lock nut to **40 Nm** using tools 3880140.

Note:

- **Ensure the adjuster nut does not move as the lock nut 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 **90 Nm**.
8. Tighten the top yoke clamp bolt to:
For America up to VIN 468389 and Speedmaster up to VIN 469049: **26 Nm**.
For America and America LT from VIN 468390 and Speedmaster from VIN 469050: **24 Nm**.
9. Check that the free play has been eliminated, and that the steering can be turned freely from lock to lock without any sign of tightness. Re-adjust if necessary.
10. **America LT only:** Refit the windscreens (see page 16-26).

Steering Stem/Bottom Yoke

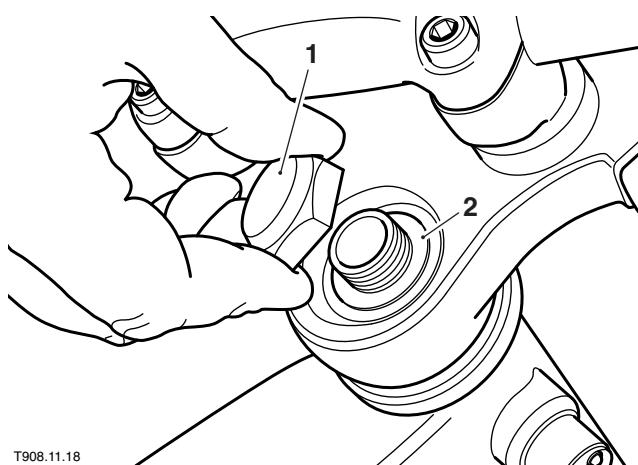
Removal



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. **America LT only:** Remove the windscreens (see page 16-26).
2. Remove both forks (see page 12-8).
3. Remove the fuel tank (see page 10A-11 for carburettor models or page 10B-76 for fuel injected models).
4. Slacken and remove the top nut and washer from the steering stem. Lift off the handlebar/top yoke assembly and position it clear.



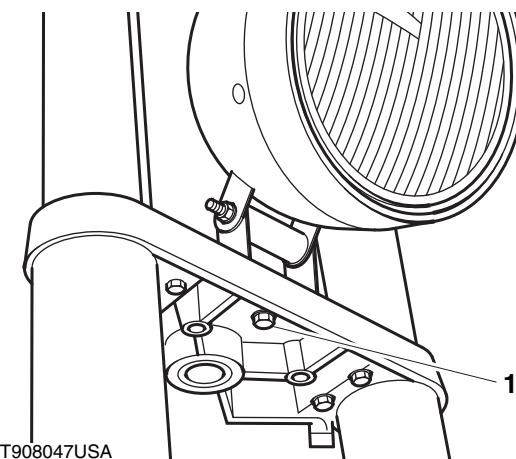
1. Top nut

2. Washer

5. America from VIN 468390 and America LT:

- Release the fixings and remove the front indicator bracket cover. Discard the fixings.
 - Release the fixings securing the front indicator bracket assembly to the lower yoke. Place the indicator bracket assembly to one side.
6. **America LT only:** Remove the lower windscreens mounting bracket (see page 16-27).

- Release the fixing securing the headlight to the lower yoke. Detach the headlight assembly and place to one side.



1. Headlight mounting fixing

- Unscrew the bolts and position the regulator/rectifier clear of the bottom yoke.
- Unscrew the bolt securing the brake hose clamp to the bottom yoke.
- Unscrew the lock nut from the steering stem.
- Support the bottom yoke then remove the adjuster nut and dust seal from the steering stem.
- Lower the steering stem/bottom yoke out of position.
- 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

- 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.

Bearing removal

- Using a suitable drift, evenly and progressively drive the bearing outer races from the frame headstock.
- Remove the inner race and dust seal from the bottom yoke using a press or puller.

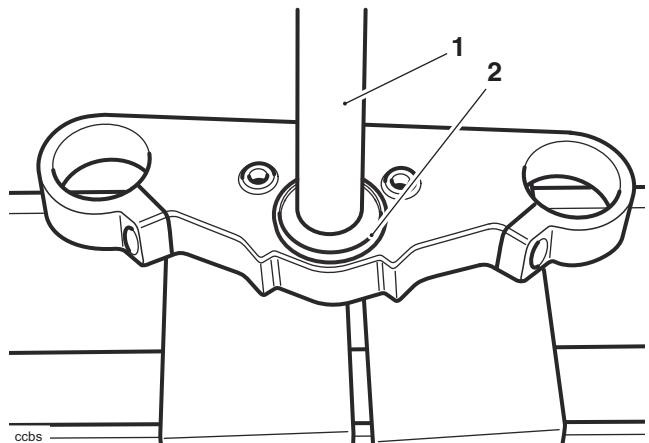


Caution

Protect the threads of the bottom yoke when using a press or puller as damaged threads may mean replacing the yoke completely.

Bearing Installation

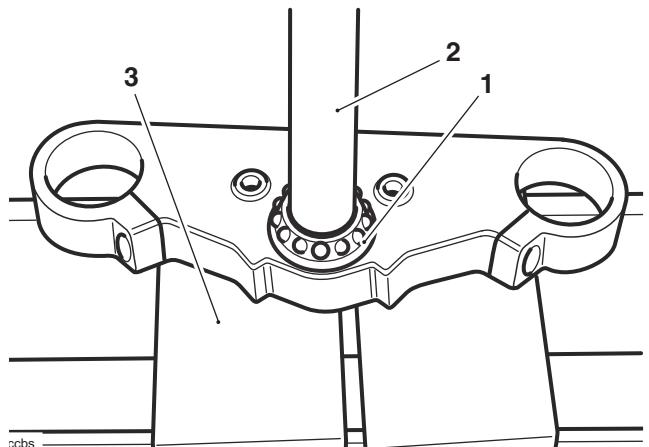
- Fit a new dust shield to the steering stem on the bottom yoke.



1. Steering stem

2. Dust shield

- Press a new inner race onto the steering stem of the bottom yoke.



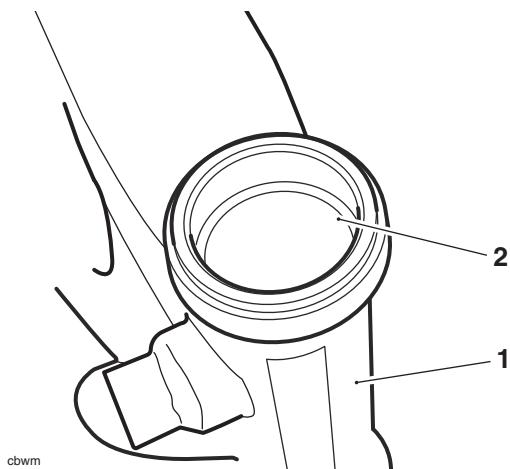
1. Bearing

2. Steering stem

3. Press bed

Front Suspension & Steering

- Evenly and progressively drive new bearing outer races into the frame headstock.



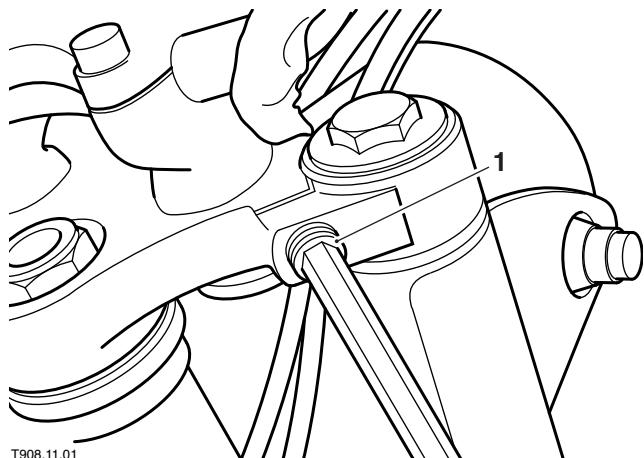
- 1. Headstock**
- 2. Bearing outer race**

Installation

- Lubricate the bearings and races with fresh grease to NLGI 2 specification. Work the grease well into the bearings and smear the steering stem with grease.
- Insert the steering stem into the headstock.
- Fit the upper bearing, inner race and dust seal and screw on the adjuster nut.
- Adjust the steering head bearing free play (see page 12-15) then tighten the lock nut to **40 Nm**.
- Refit the headlight assembly to the lower yoke and tighten the bracket fixing to:
For America up to VIN 468389 and Speedmaster up to VIN 469049: **27 Nm**.
For America and America LT from VIN 468390 and Speedmaster from VIN 469050: **21 Nm**.
- America LT only:** Refit the lower windscreens mounting bracket (see page 16-27).

- America from VIN 468390 and America LT:**

- Refit the front indicator bracket assembly to the lower yoke. Tighten the fixings to **10 Nm**.
 - Refit the front indicator bracket cover. Fit new fixings and tighten to **5 Nm**.
- Install the front forks (see page 12-9).
 - Locate the top yoke assembly on the steering stem. Fit the washer and hand-tighten the top nut.
 - Tighten the steering stem top nut to **90 Nm**.
 - Tighten the top yoke clamp bolt to:
For America up to VIN 468389 and Speedmaster up to VIN 469049: **26 Nm**.
For America and America LT from VIN 468390 and Speedmaster from VIN 469050: **24 Nm**.



- 1. Top yoke clamp bolt**
- Ensure all fasteners are correctly tightened then install the fuel tank (see page 10A-12 for carburettor models or page 10B-77 for fuel injected models).
- Check the headlight alignment (see page 17-21).
- America LT only:** Refit the windscreens (see page 16-26).

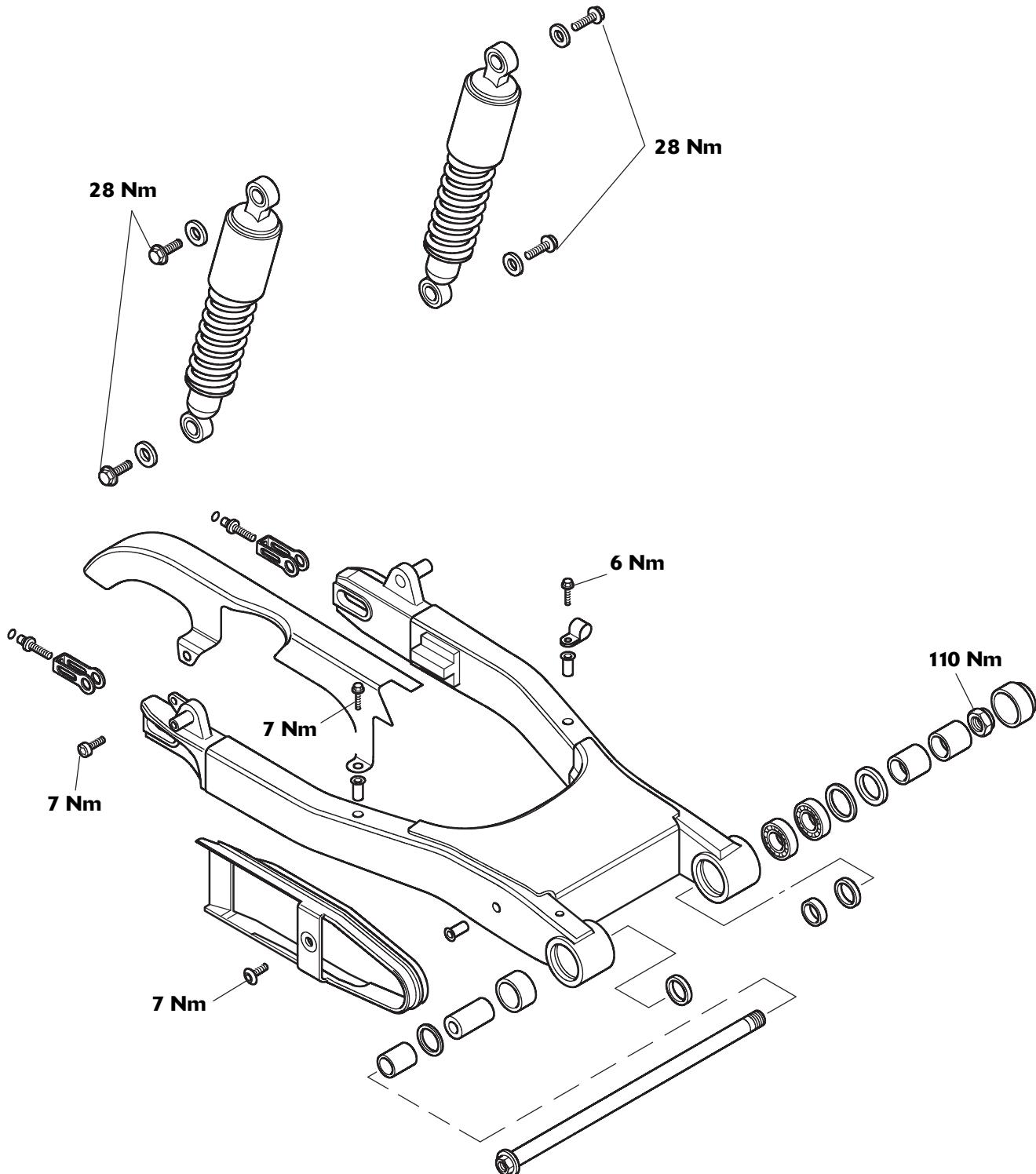
13 Rear Suspension

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Exploded View - Swinging Arm and Rear Suspension.....	13.2
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Swinging Arm	13.4
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Installation	13.6

Rear Suspension

Exploded View - Swinging Arm and Rear Suspension



Rear Suspension Unit

Adjustment

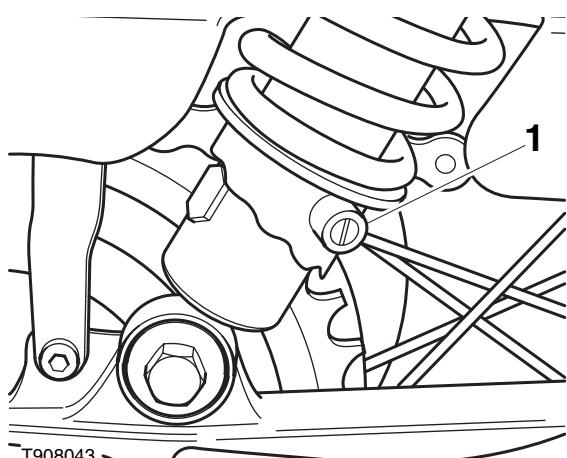
- The spring preload settings on the rear suspension units are adjustable. Each unit has a five-position adjuster collar fitted to the lower end of the spring.
- Set both rear suspension unit adjuster collars to the required position. Recommended settings are as follows.

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



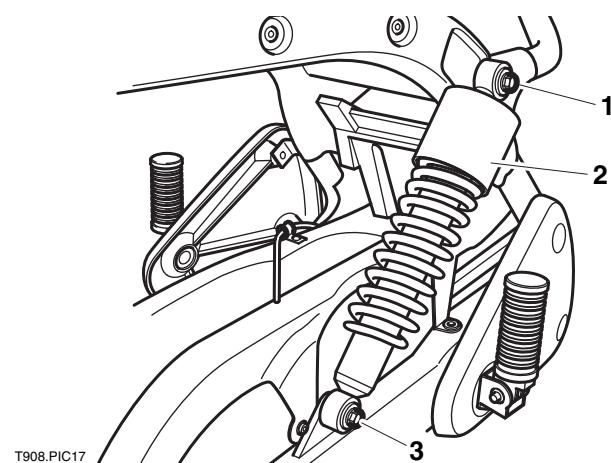
Warning

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.

- 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.
- Remove the upper and lower mounting bolts and washers, discard the bolts. Remove the suspension unit.



- Upper mounting bolts
- Rear suspension unit
- Lower mounting bolts

Note:

- The rear suspension units are each located on a spigot at their upper and lower mounting points.
- Repeat operations 1 to 3 for the other rear suspension unit (if required).

Inspection

- Remove all traces of dirt and inspect for damage/wear to the mountings and spring.
- 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.



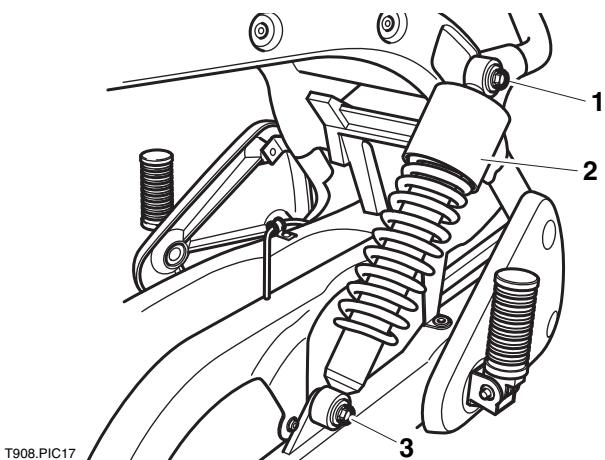
Warning

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.

Rear Suspension

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 bolts

2. Rear suspension unit

3. Lower mounting bolts

2. Secure the rear suspension unit with the washers and new mounting bolts. Tighten the bolts to **28 Nm**.
3. Repeat operations 1 to 3 for the other rear suspension unit (if removed).
4. Remove the wheel support block.

Swinging Arm

Removal

! Warning

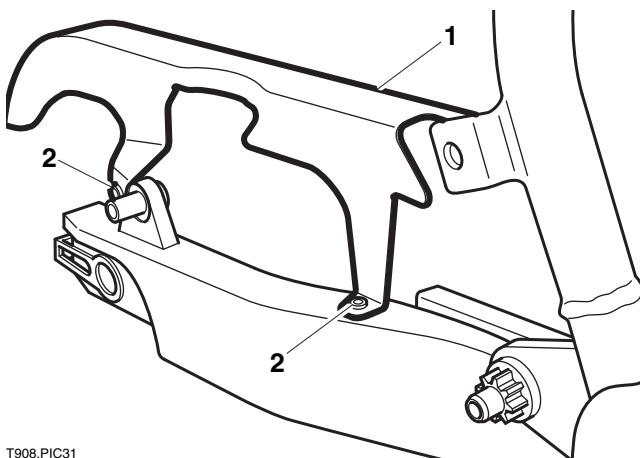
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

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 (see page 15-22).

! 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.

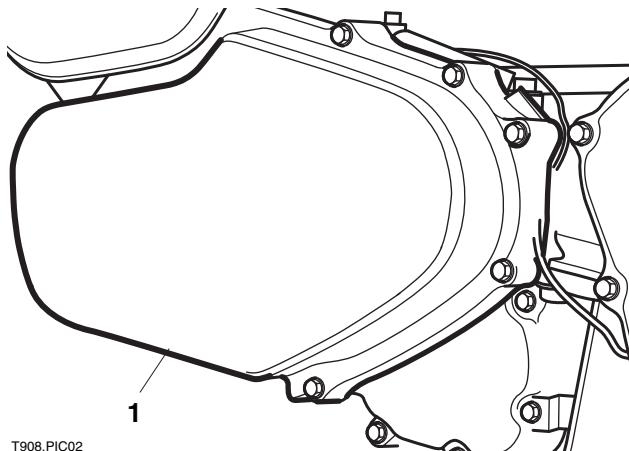
4. Remove both exhaust silencers (see page 10A-33 for carburettor models or page 10B-103 for fuel injected models).
5. Undo the screws and remove the chainguard.



1. Chain guard

2. Chain guard fixing locations

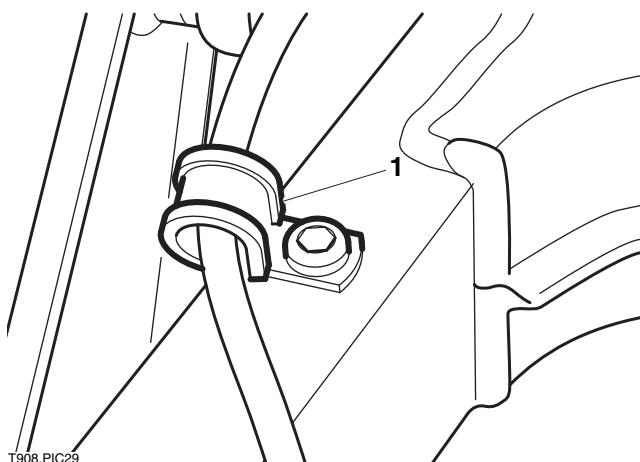
6. Remove the sprocket cover from the engine.



T908.PIC02

1. Sprocket cover

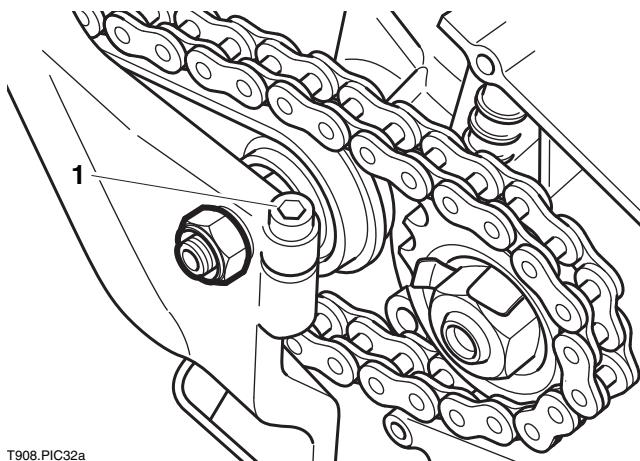
7. Undo the screw and free the rear brake hose clamp from the swinging arm.



T908.PIC29

1. Brake hose clamp

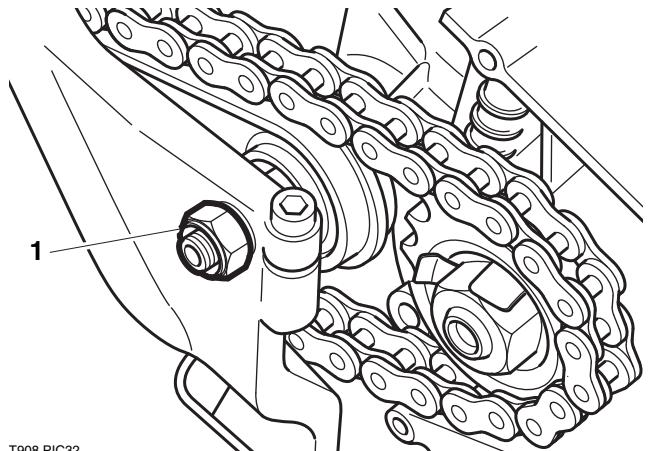
8. Remove both rear suspension units (see page 13-3).
9. Remove the cap from the swinging arm pivot nut.
10. Slacken the swinging arm outrigger clamp bolts on the left and right side of the frame.



T908.PIC32a

1. Outrigger clamp bolt (left hand shown)

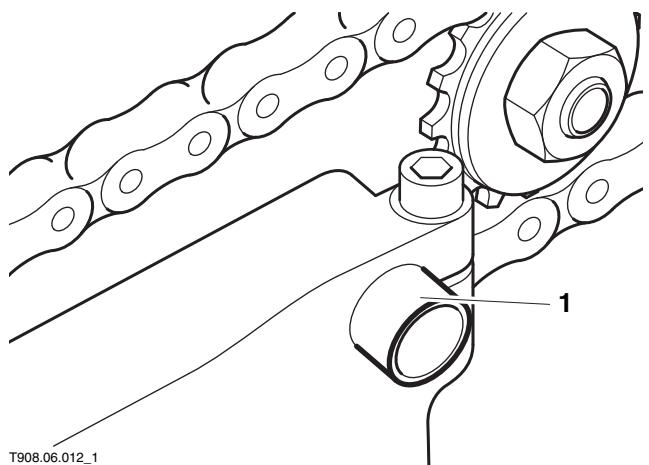
11. Unscrew the nut from the swinging arm pivot bolt.



T908.PIC32

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.



T908.06.012_1

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.

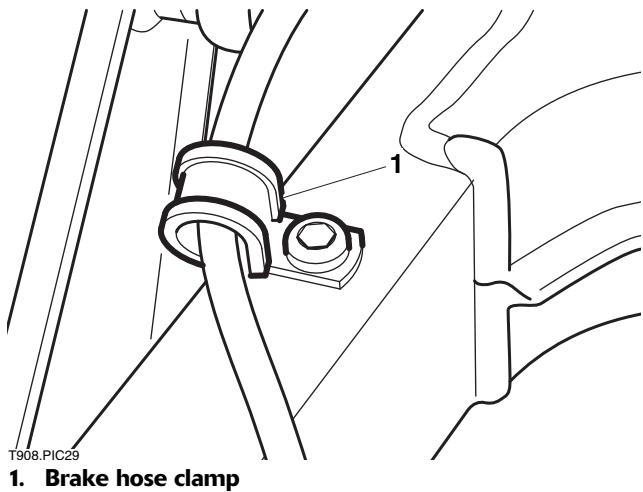
Rear Suspension

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 **40 Nm**.
- 7. Refit both rear suspension units (see page 13-4).
- 8. Position the rear brake hose clamp to the swinging arm and tighten its screw to **6 Nm**.



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 (see page 15-23).
13. Refit both exhaust silencers (see page 10A-33 for carburettor models or page 10B-104 for fuel injected models).
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 (see page 11-9).



Warning

Use only DOT 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those DOT 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.

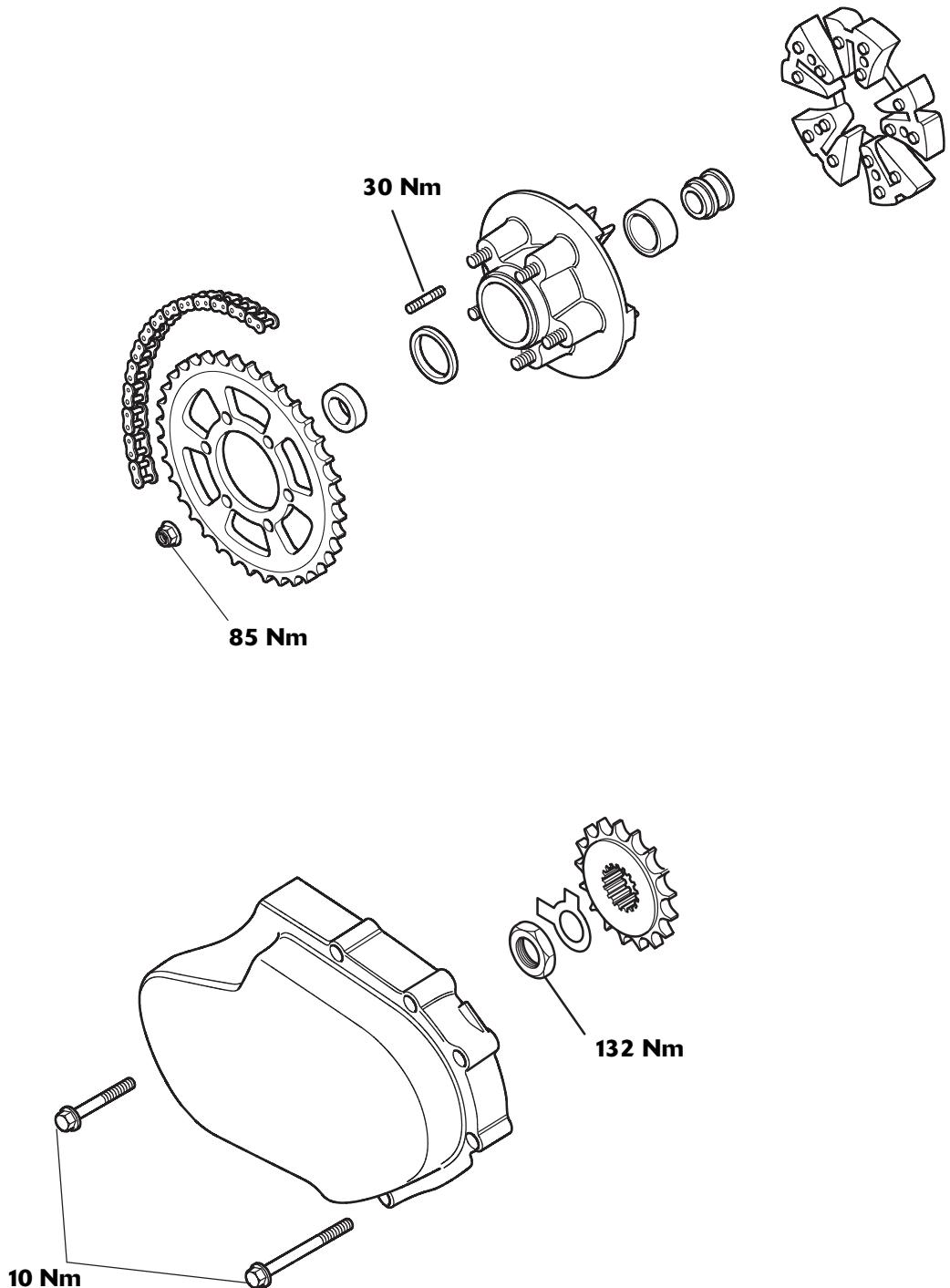
14 Final Drive

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Final Drive

Exploded View - Final Drive



Drive Chain Free Play Check, Adjustment & Lubrication

Free play check



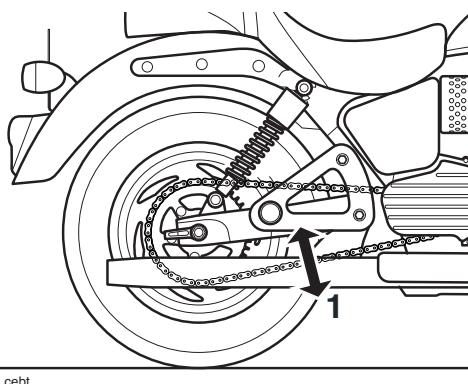
Warning

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. Rotate the rear wheel to find the position where the chain has least slack.

Note:

- **Always check/adjust the drive chain free play 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 35 - 45 mm.



1. Drive chain free play 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 free play at the point where the chain has least slack.**
- 2. Position the motorcycle on the side stand.



Warning

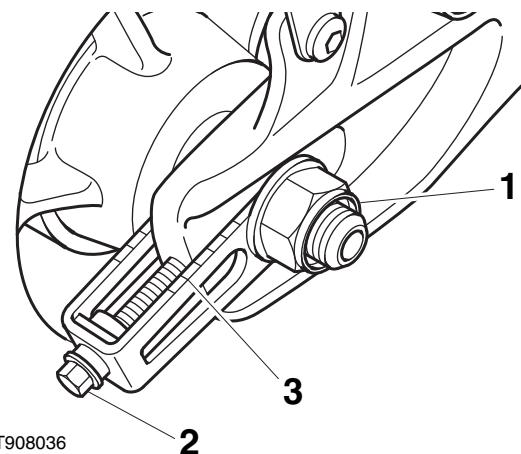
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

3. Slacken the rear wheel spindle nut.
4. Adjust the drive chain free play by rotating the adjuster bolts. Rotate the bolts clockwise to increase chain free play and anti-clockwise to reduce free play. 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 free play is correctly set, tighten the rear wheel spindle nut to **110 Nm**.
6. Rotate the rear wheel and recheck the free play. Readjust if necessary.
7. Tighten the adjusters, anti-clockwise, to **2 Nm**.
8. On completion, rotate the adjuster bolts anti-clockwise until their shoulders are in firm contact with the adjusters.

Final Drive

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.

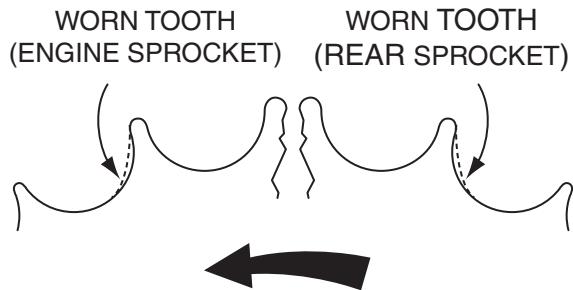
Drive Chain & Sprocket Wear Check



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.

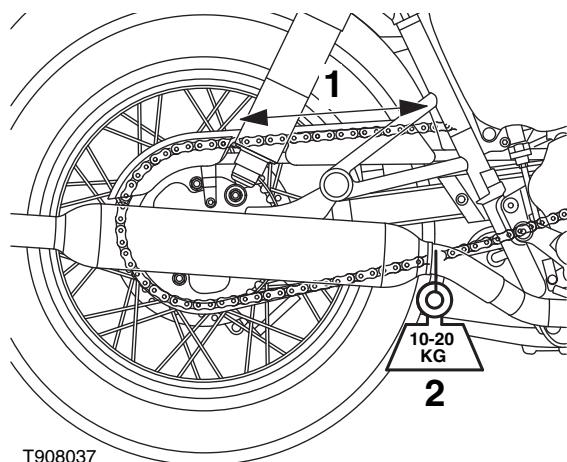
1. Position the motorcycle on the side stand.
2. Undo the screws and remove the chainguard from the swinging arm.
3. Unscrew the bolts and remove the sprocket cover from the engine.
4. Examine the whole length of the chain. If there are any excessively tight or loose sections, loose pins or damaged rollers, the chain and sprockets should be renewed.
5. Inspect sprockets for unevenly or excessively worn teeth. Also examine the sprockets for damaged teeth.



cool
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.

- 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.



1. Drive chain length measurement point

2. Weight

- 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.

- Also check the drive chain slider on the swinging arm for signs of wear or damage. Renew if necessary.
- Refit the sprocket cover, tightening its bolts to **10 Nm**.
- Refit the chainguard to the swinging arm, tightening its screws to **7 Nm**.

Drive Chain Replacement

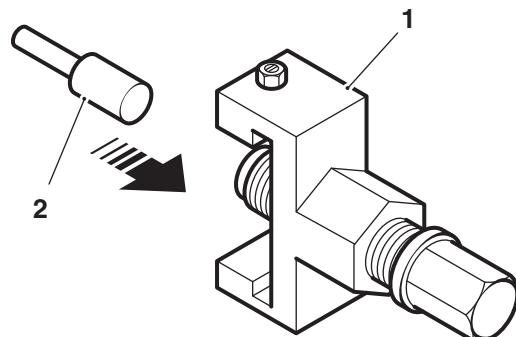
Rivet link type

The following instructions for the replacement of rivet link type drive chains requires the use of service tool A9938017.

! 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.

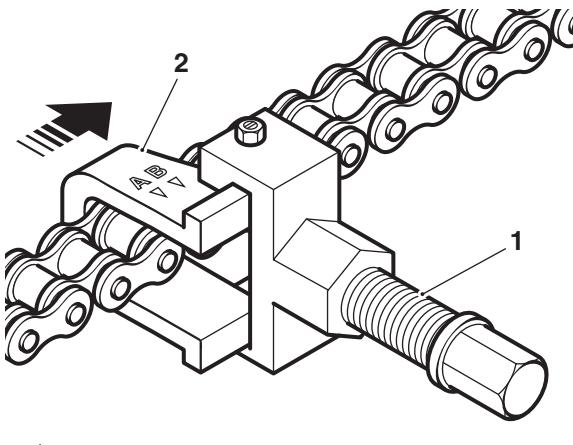
- Support the motorcycle on a stand so the rear wheel is clear of the ground.
- Insert the pin into the pin holder so its smaller diameter end (cutting point) is facing away from the holder as shown.



- Tool body and pin holder
- Pin

Final Drive

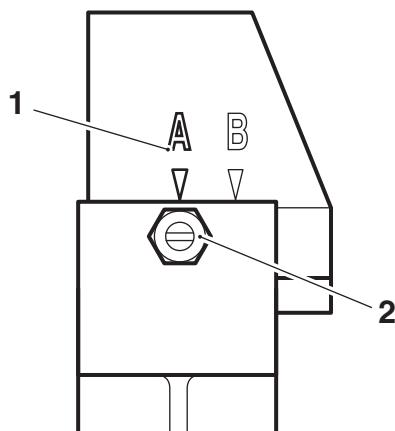
3. Position the U-shaped holder behind the chain ensuring its A and B marks are uppermost.
4. Slide the tool body assembly onto the U-shaped holder ensuring its adjustment screw is uppermost.



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.

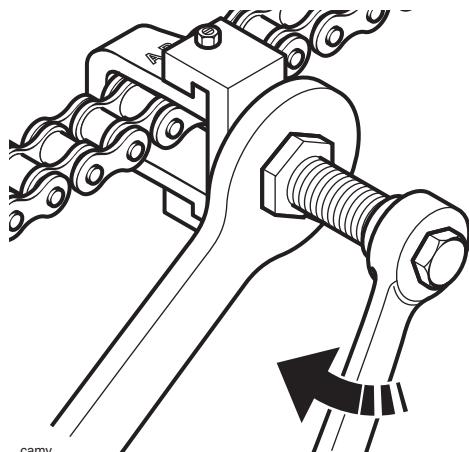


1. U-shaped holder A mark

2. Tool body adjustment screw and lock nut

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

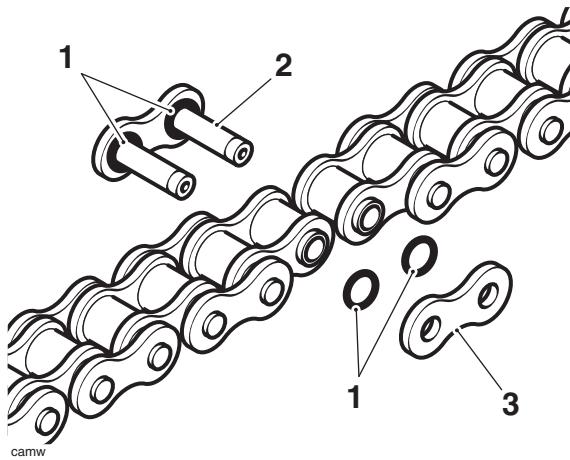
The component parts of the new link kit are coated with a special grease which must not be removed. Removal of this special grease will severely reduce the service life of the chain.

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:

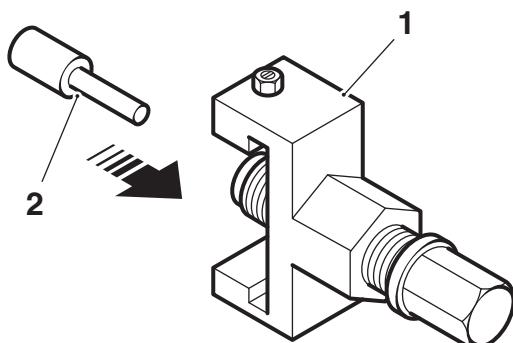
- Do not use the new connector link as the special grease on it may be removed.

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.



- 1. O-rings**
2. Link
3. Link plate

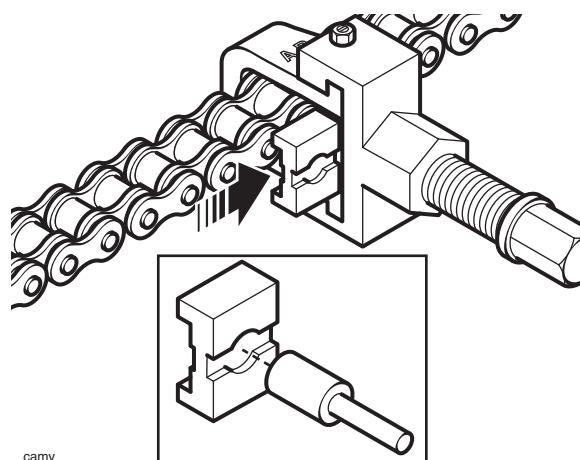
11. Insert the pin into the pin holder so its larger diameter end (riveting point) is facing away from holder as shown.



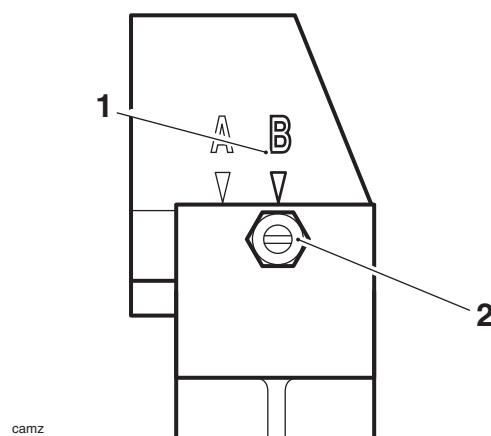
- 1. Tool body and pin holder**
2. Pin

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.



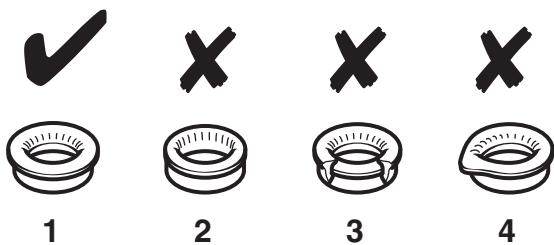
16. Locate both the split link pins in the circular cutouts in the U-shaped holder then screw the pin holder in until the plate holder contacts the link plate. Ensure both the split link and link plate are correctly located in their holders.
 17. Retain the tool body with a wrench then tighten the pin 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.



- 1. 'U' shaped holder B mark**
2. Tool body adjustment screw and lock nut

Final Drive

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

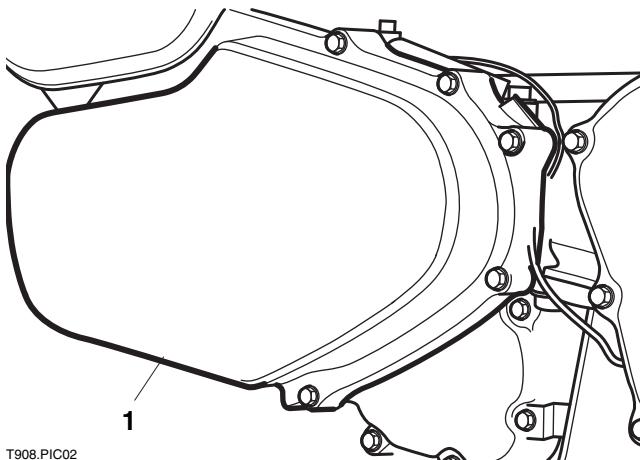
Removal



Warning

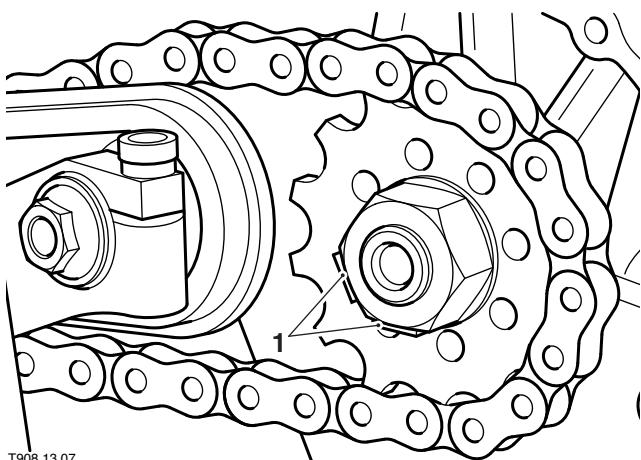
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Position the motorcycle on the side stand.
2. Unscrew the bolts and remove the sprocket cover from the engine.



1. Sprocket cover

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.

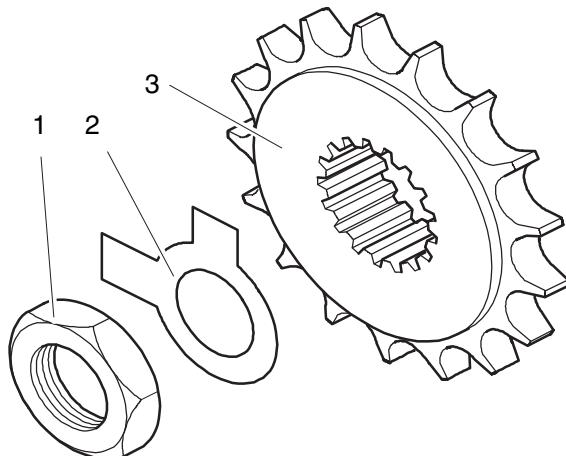
Note:

- **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 free play 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 free play.
- 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 **10 Nm**.

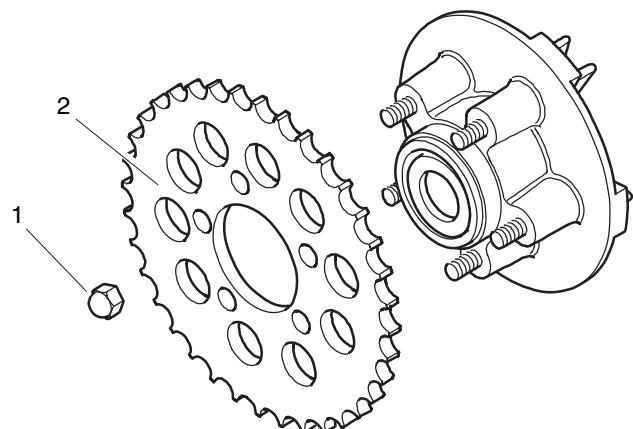
Rear Sprocket

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 (see page 15-22).
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 **85 Nm**.
4. Refit the rear wheel (see page 15-23).

Final Drive

Rear Sprocket Carrier & Cush Drive

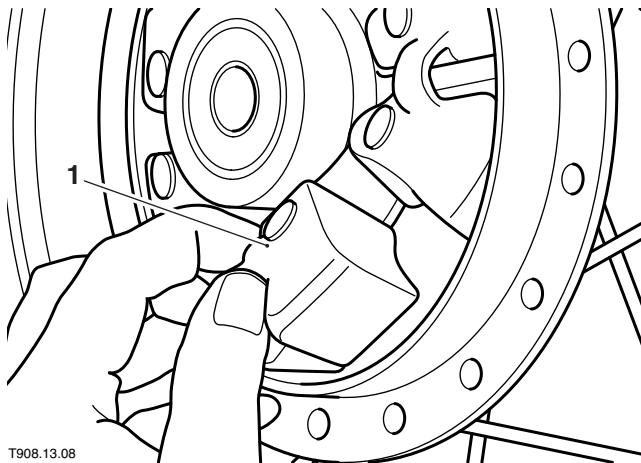
Removal



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 (see page 15-22).
2. Remove the sprocket carrier from the wheel, along with its spacer.
3. Remove the cushion 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 cushion drive rubbers. Renew as necessary.

Installation

1. Fit the cushion 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 (see page 15-23).

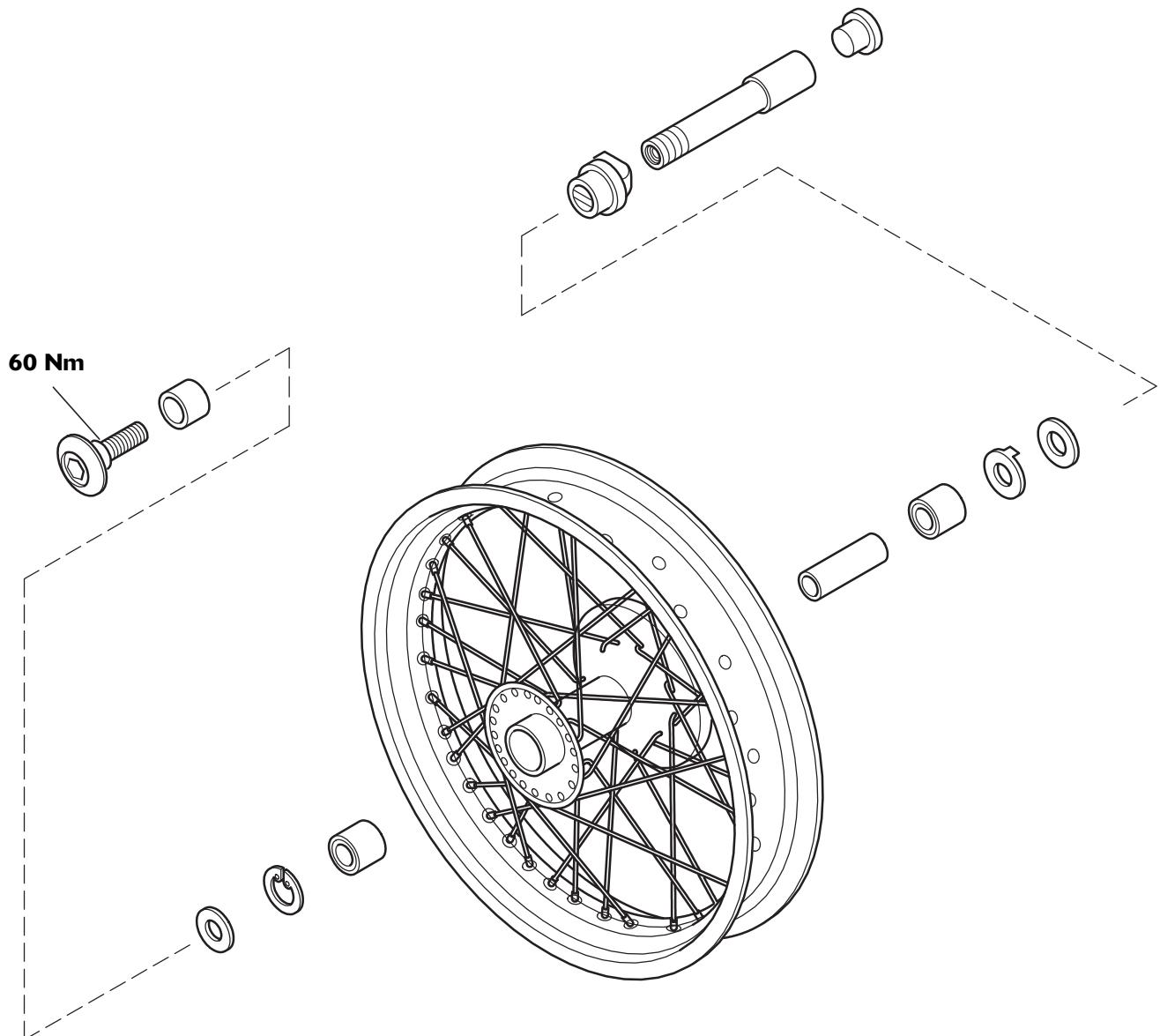
15 Wheels & Tyres

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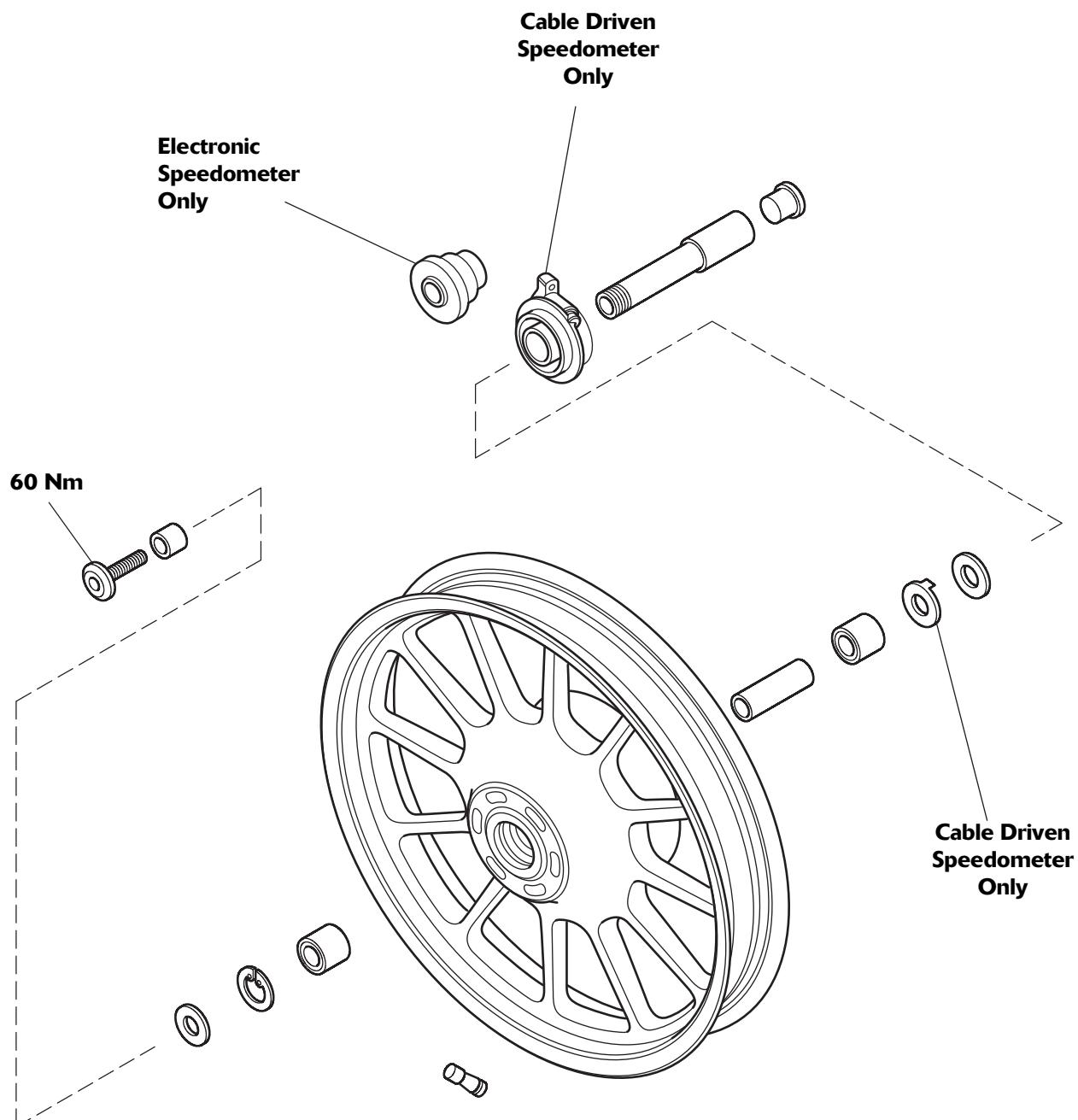
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Wheels & Tyres

Exploded View - Front wheel assembly - America - up to 2006 MY

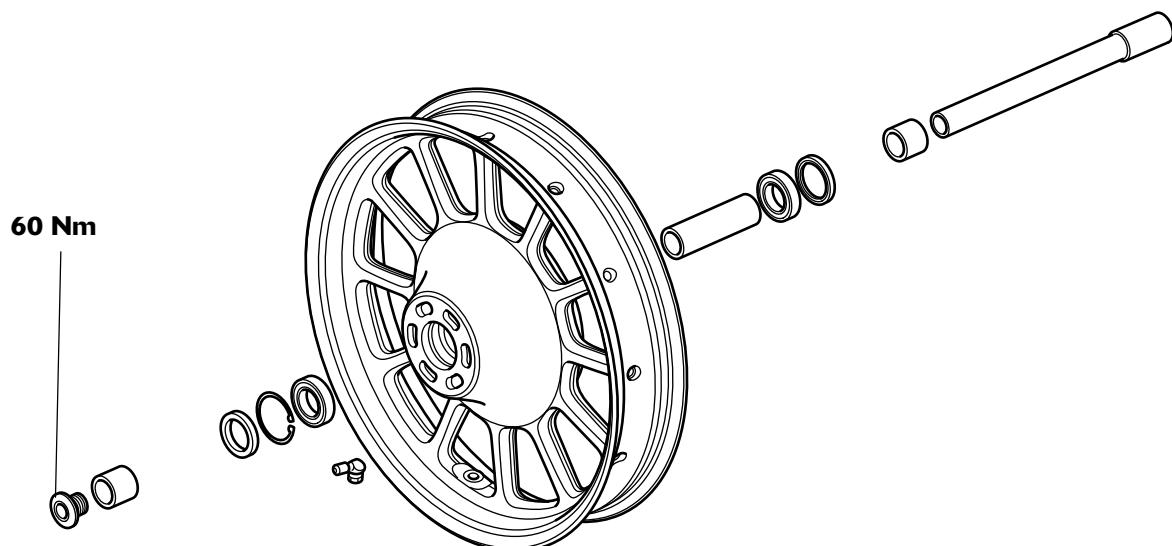


Exploded View - Front wheel assembly - America - from 2007 MY to VIN 468389

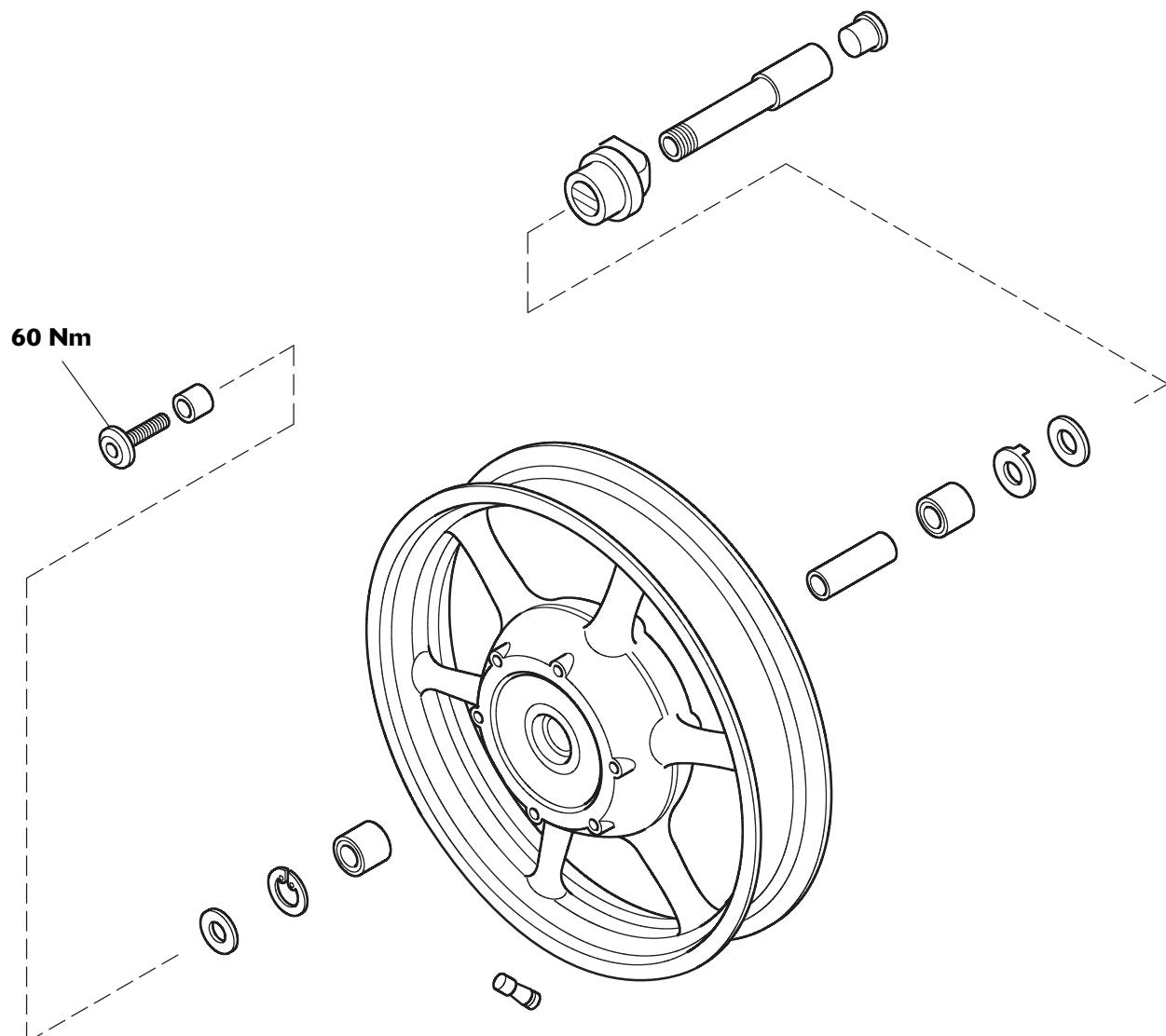


Wheels & Tyres

Exploded View - Front wheel assembly - America and America LT - from VIN 468390

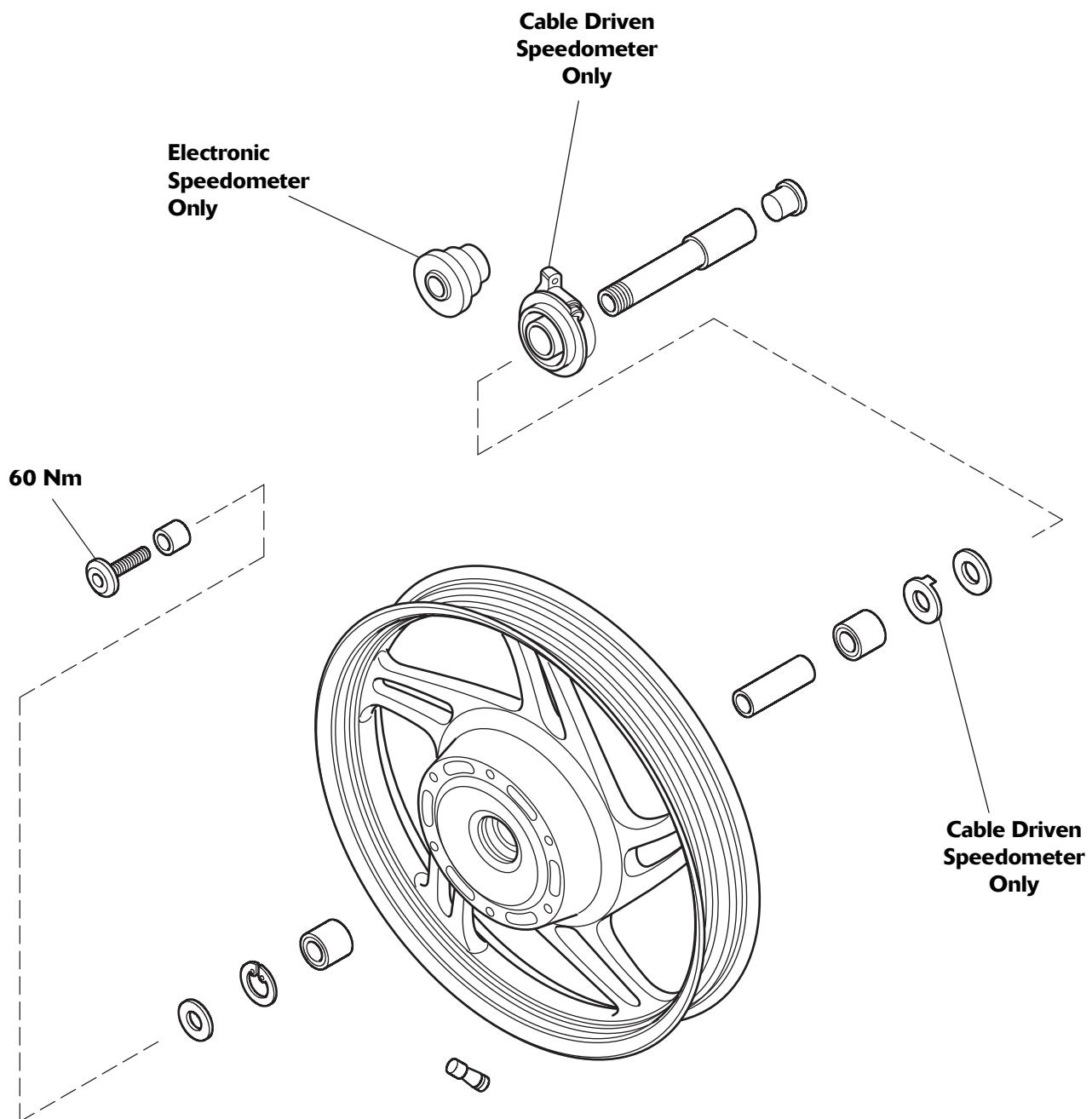


Exploded View - Front wheel assembly - Speedmaster - up to 2006 MY

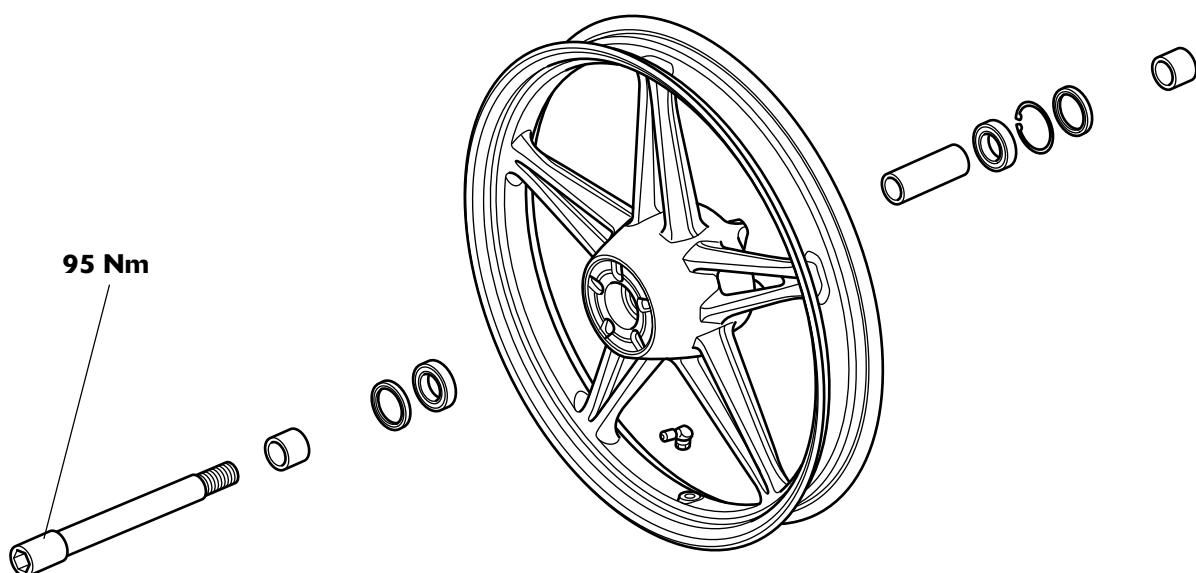


Wheels & Tyres

Exploded View - Front wheel assembly - Speedmaster - from 2007 MY to VIN 469049

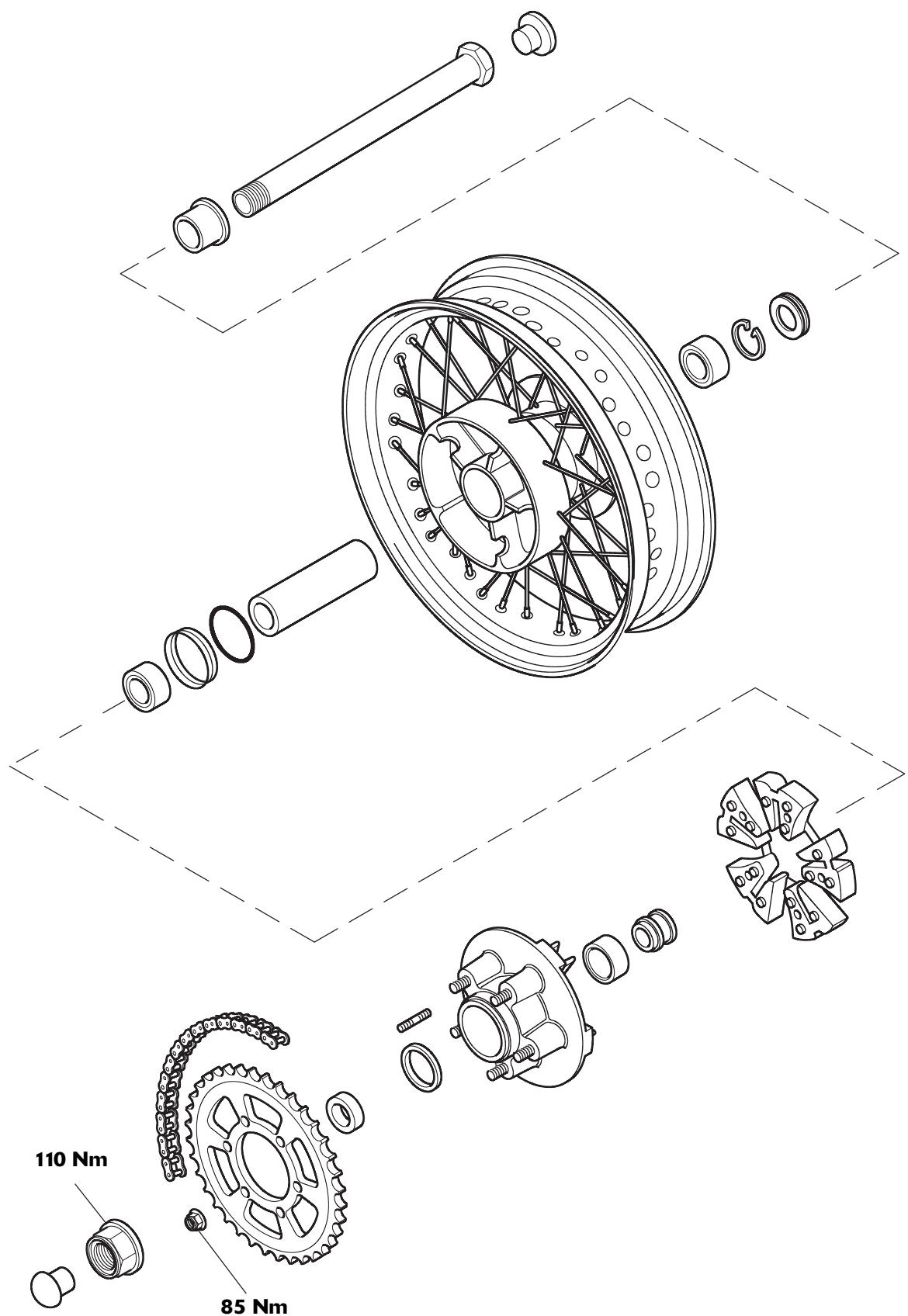


Exploded View - Front wheel assembly - Speedmaster - from VIN 469049

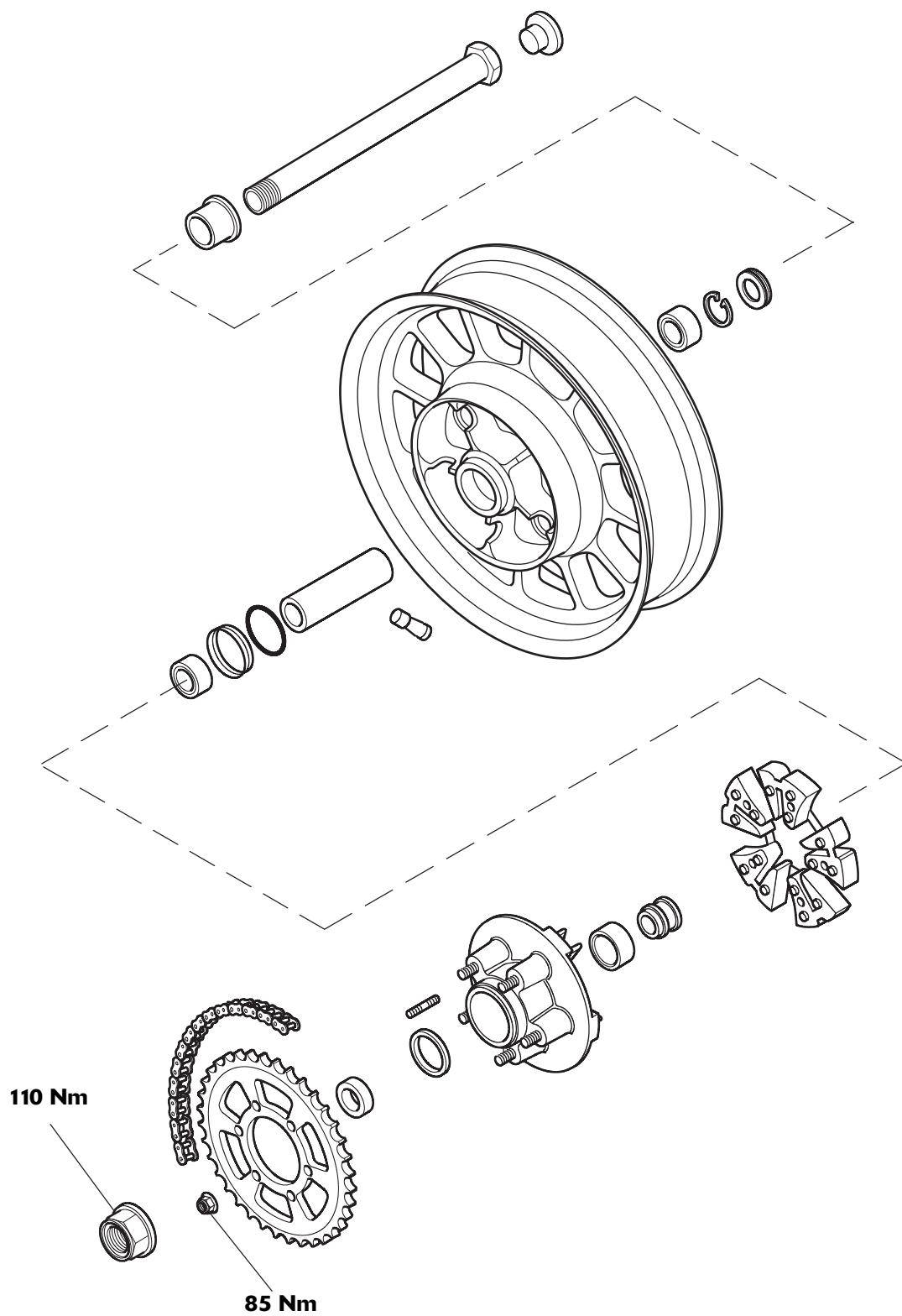


Wheels & Tyres

Exploded View - Rear Wheel Assembly - America - up to 2006 MY

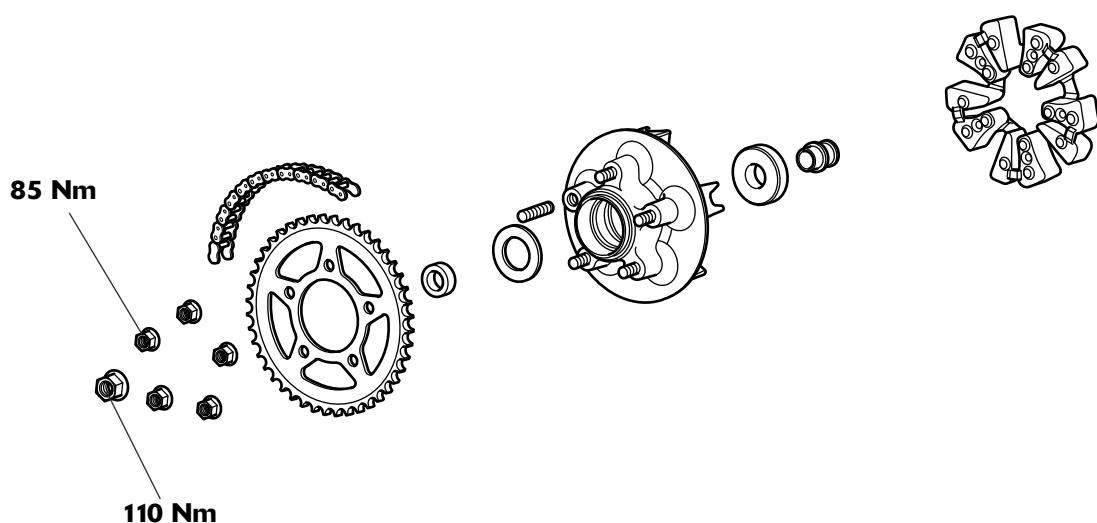
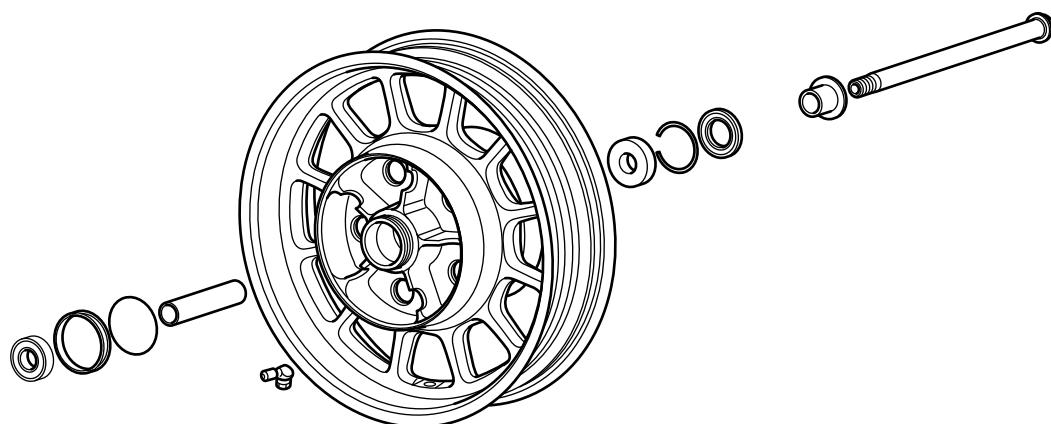


Exploded View - Rear Wheel Assembly - America - from 2007 MY to VIN 468389

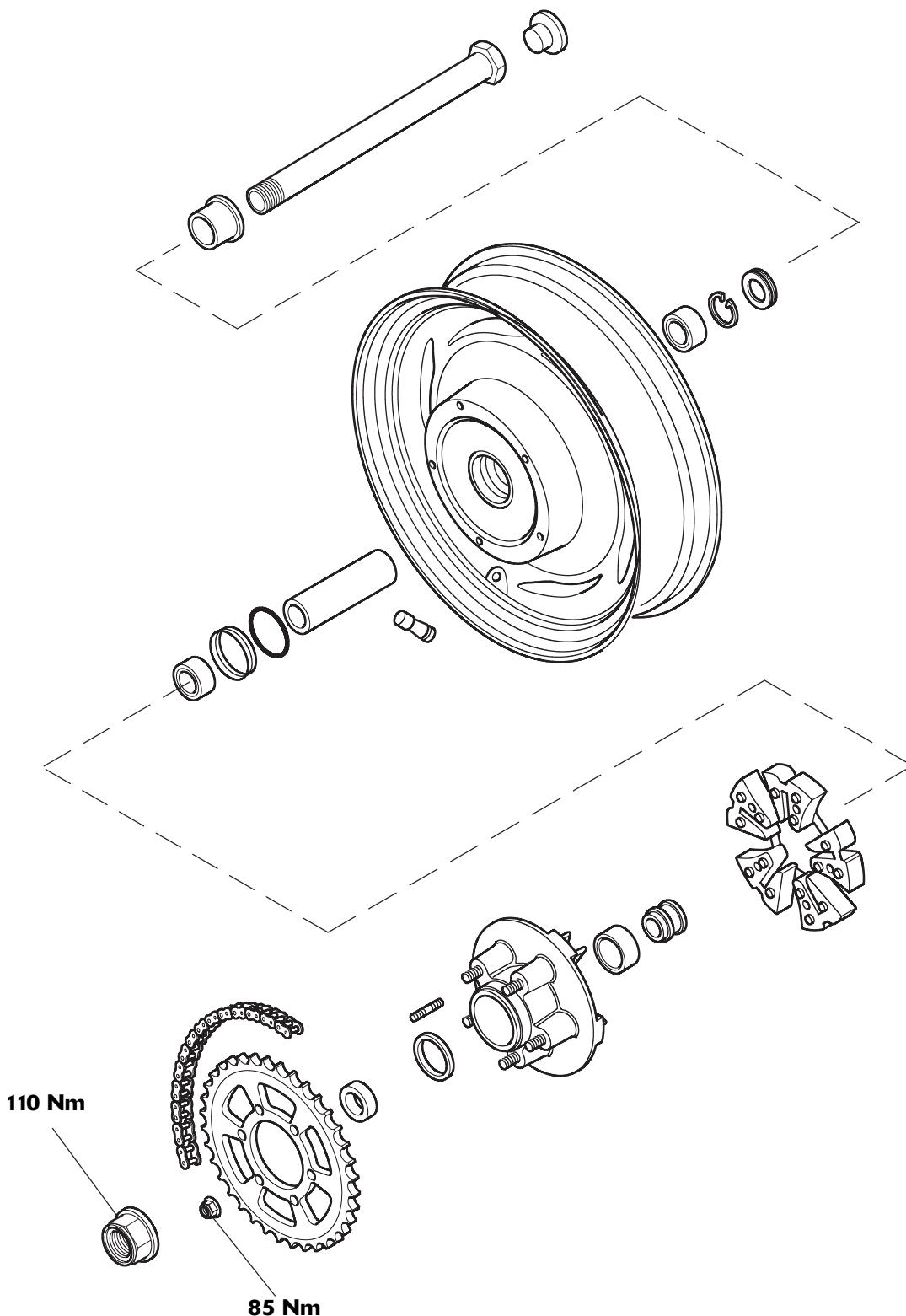


Wheels & Tyres

Exploded View - Rear Wheel Assembly - America and America LT - from VIN 468390

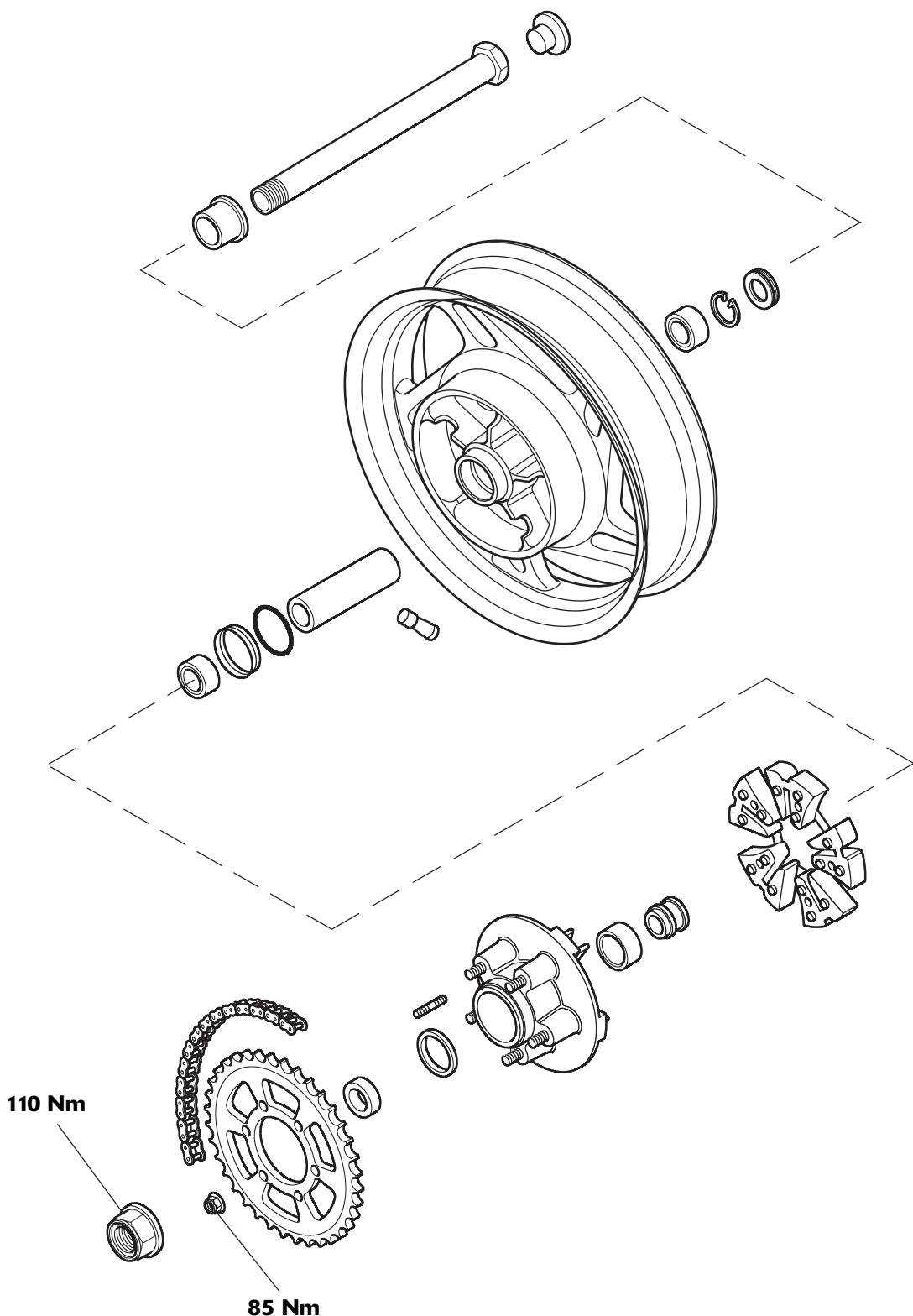


Exploded View - Rear Wheel Assembly - Speedmaster - up to 2006 MY

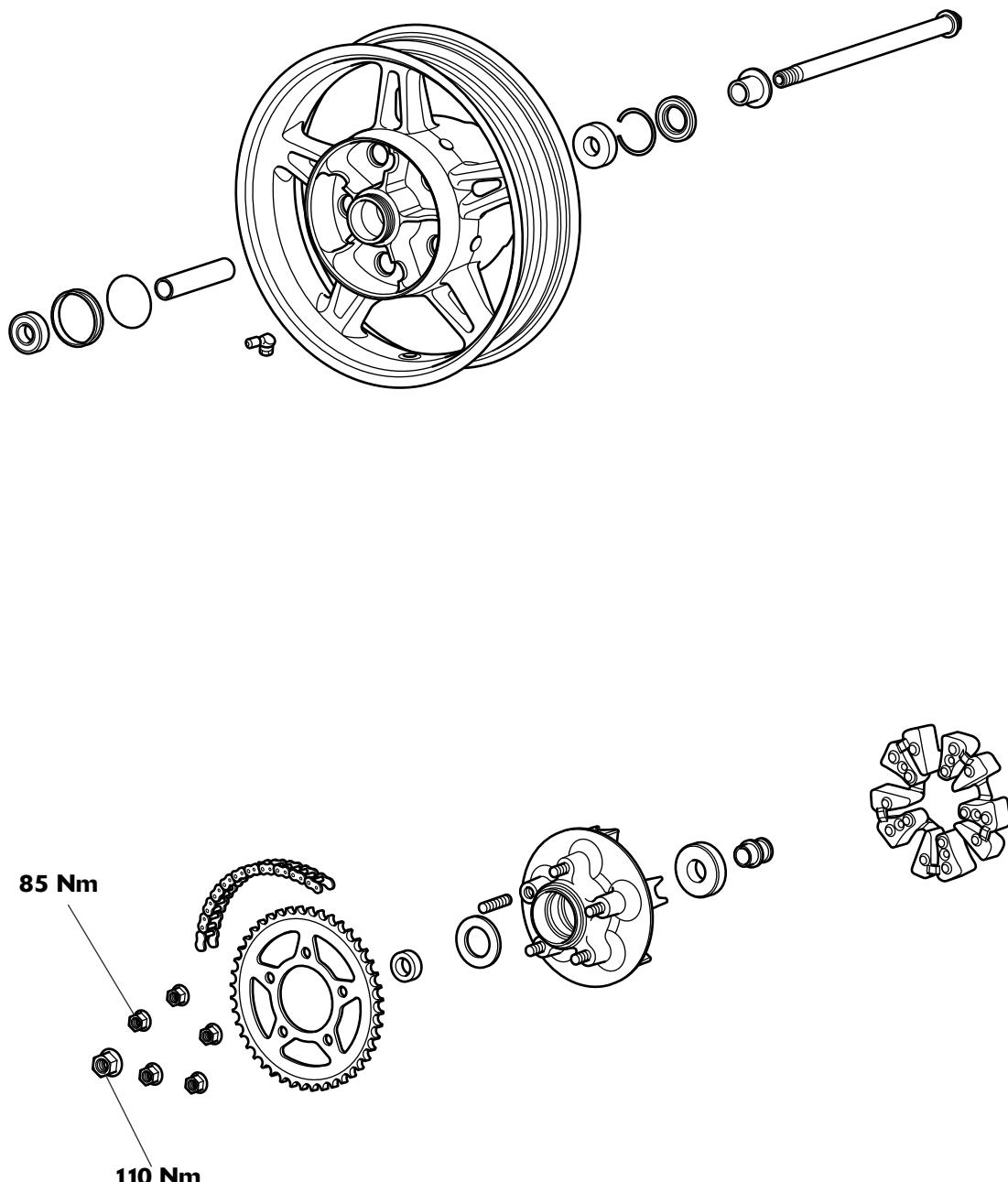


Wheels & Tyres

Exploded View - Rear Wheel Assembly - Speedmaster - from 2007 MY to VIN 469049



Exploded View - Rear Wheel Assembly - Speedmaster - from VIN 469050



Wheels & Tyres

Tyre Safety Precautions

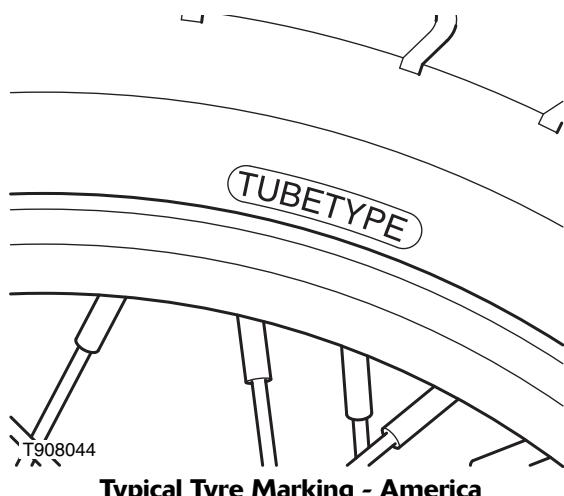
Tyres

America (up to 2006 MY) models are equipped with spoked wheels which require a tyre suitable for use with an inner tube.



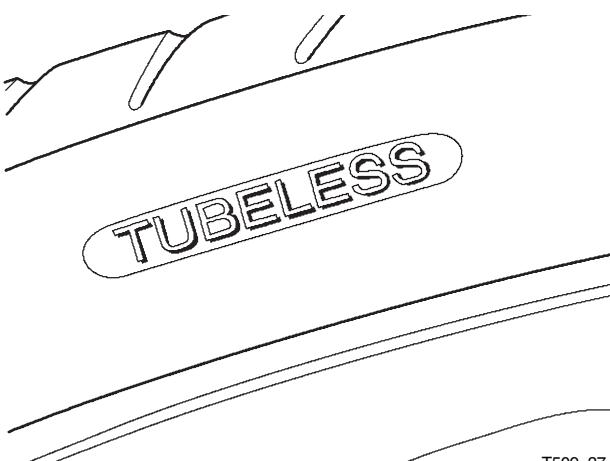
Warning

Failure to use an inner tube in a spoked wheel will cause deflation of the tyre resulting in loss of control and an accident.



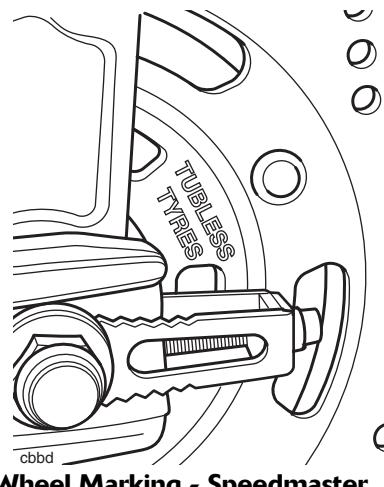
Typical Tyre Marking - America

America and America LT (from 2007 MY) and All 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'.



T509-37

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.

America - with spoked wheels		
Loading condition	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)

America up to VIN 468389 and Speedmaster with cast wheels		
Loading condition	Solo	Fully laden

America up to VIN 468389 and Speedmaster with cast wheels

Front	2.50 Bar (36 lb/in ²)	2.50 Bar (36 lb/in ²)
Rear	2.90 Bar (42 lb/in ²)	2.90 Bar (42 lb/in ²)

America and America LT from VIN 468390

Loading condition	Solo	Fully laden
Front	2.00 Bar (30 lb/in ²)	2.00 Bar (30 lb/in ²)
Rear	2.90 Bar (42 lb/in ²)	2.90 Bar (42 lb/in ²)

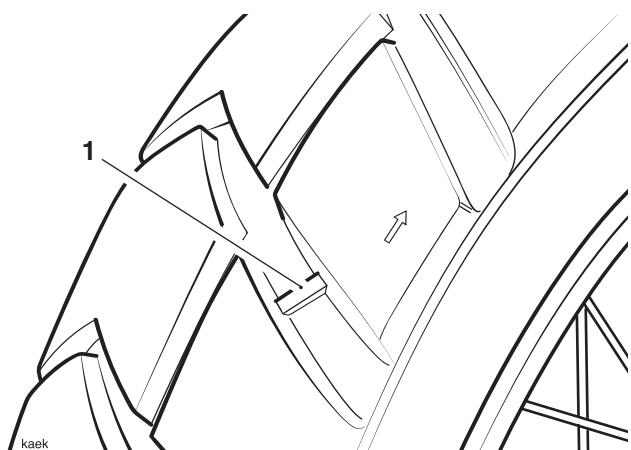
! Warning

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.

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, embedded 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.

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.

Wheels & Tyres

Minimum Recommended Tread Depth

The following chart can be used as a guide to the minimum safe tread depth.

Under 130 km/h (80 mph)	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.



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 - America - with Spoked Wheels



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.

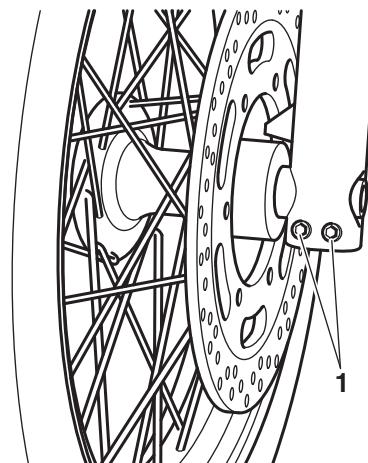
1. Support the motorcycle so that the front wheel is clear of the ground.

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.**
- **If two front discs are fitted, observe the direction arrow on discs. For correct installation of the front wheel they must be pointing in the forward direction of rotation when fitted to the motorcycle.**

2. Remove the front wheel spindle bolt.
3. Slacken the wheel spindle clamp bolts on both forks.

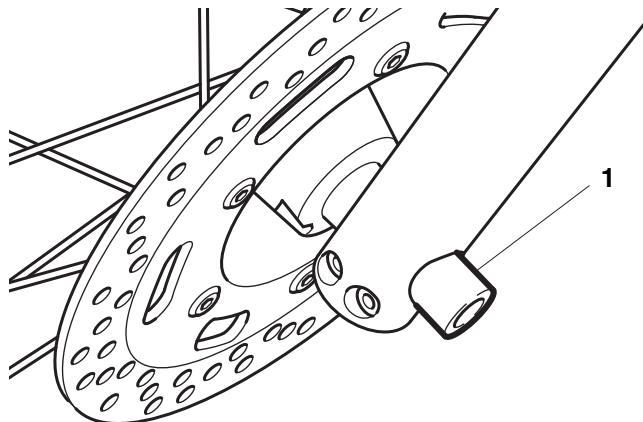
P6270020



1. Spindle clamp bolts

Wheels & Tyres

- Support the wheel and withdraw the spindle.



T908.PIC02A

1. Wheel Spindle

- 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.

- Recover the spacer from the right side of the hub.



Caution

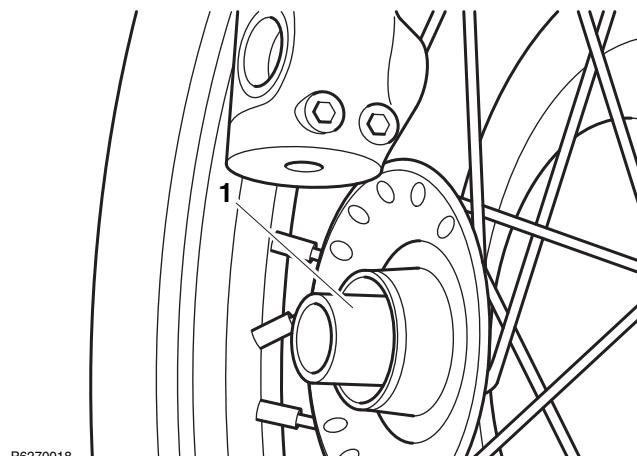
Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.

Inspection - America

- Check closely for signs of loose or broken spokes. Renew/tighten spokes as necessary.
- Check the wheel bearings spin smoothly with no signs of play. If not, renew both bearings.
- Inspect the speedometer drive and its driveplate for signs of wear or damage. Renew as necessary.

Installation - America

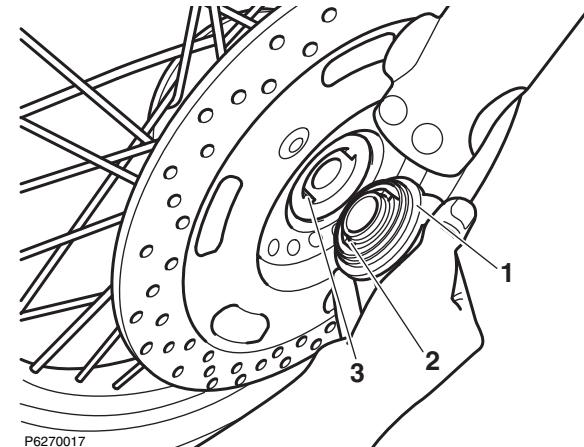
- Lubricate the lips of the wheel bearing seals with a smear of multi-purpose grease.
- Thoroughly clean both sides of the brake disc.
- Position the wheel between the forks and fit the spacer to the right side of the wheel.



P6270018

1. Spacer

- Align the speedometer drive gear cut-outs with the driveplate tabs and fit the drive to the left side of the wheel.



P6270017

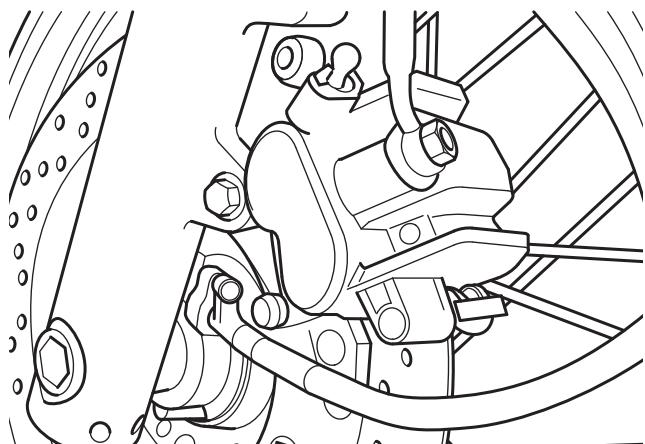
1. Speedometer drive

2. Drive cut-outs

3. Driveplate tabs

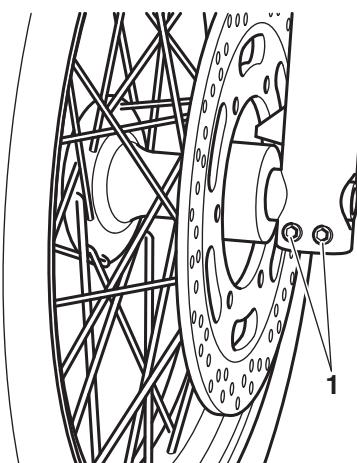
- Align the wheel to the fitted position and insert the spindle from the left hand side.
- On the right hand side, fit the bolt to the spindle and tighten to **60 Nm**.
- Lower the motorcycle to the ground and park on the side stand.

- Ensure the speedometer drive is positioned as shown below.



Speedometer Drive Position

- Pump the front forks a few times then tighten the spindle clamp bolt to **20 Nm**.



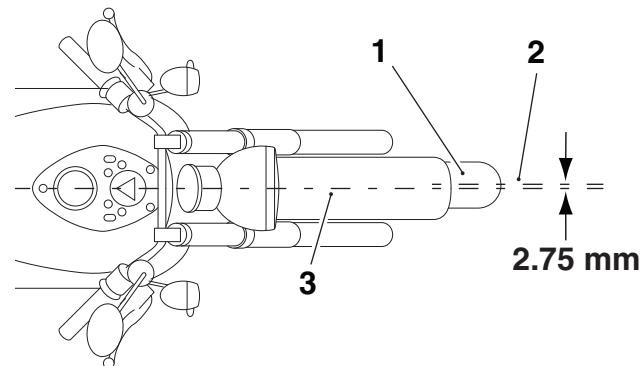
1. Spindle clamp bolts

- Park the motorcycle on the side stand.

Front Wheel

America only: From VIN 468424, the centre line of the front wheel is 2.75 mm to the left of the motorcycle's centre line. When checking the alignment of the motorcycle, it is normal for the front wheel to be offset by this amount.

America motorcycles with the following VINs will also have the front wheel offset, 466346, 466347, 467061, 467542 and 468420.



- 1. Front wheel**
- 2. Front wheel centre line**
- 3. Motorcycle centre line**

Wheels & Tyres

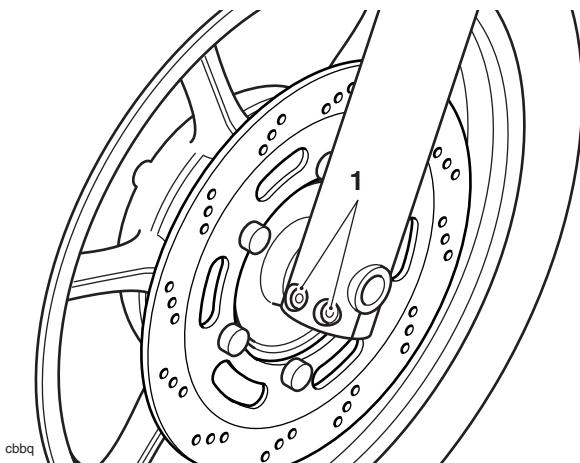
Removal - Speedmaster, America and America LT with Cast Wheels



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.

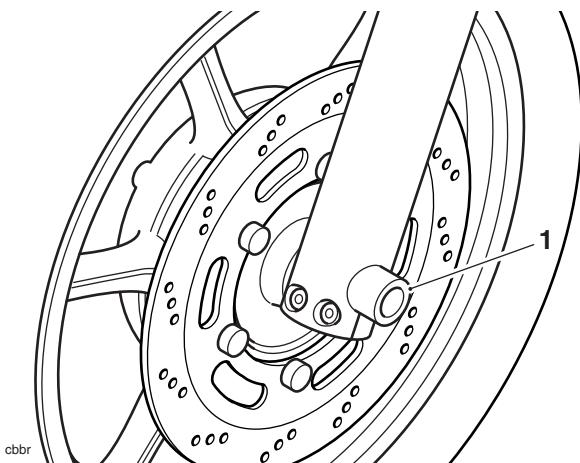


Caution

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. **Models with cable driven speedometer only:**
Manoeuvre the wheel out from the forks collecting the speedometer drive as you do so.
7. **Models with electronic speedometer only:**
Manoeuvre the wheel out from the forks collecting the large spacer from the left side of the hub 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.

8. **All models:** Recover the small spacer from the right side of the hub.



Caution

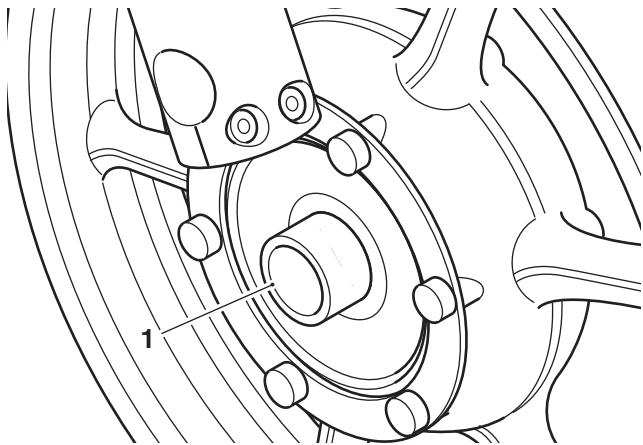
Do not allow the wheel to rest on the brake disc as this could damage the disc. To prevent bearing damage, ensure no dirt enters the wheel bearings whilst the wheel is removed.

Inspection - Speedmaster, America and America LT with Cast Wheels

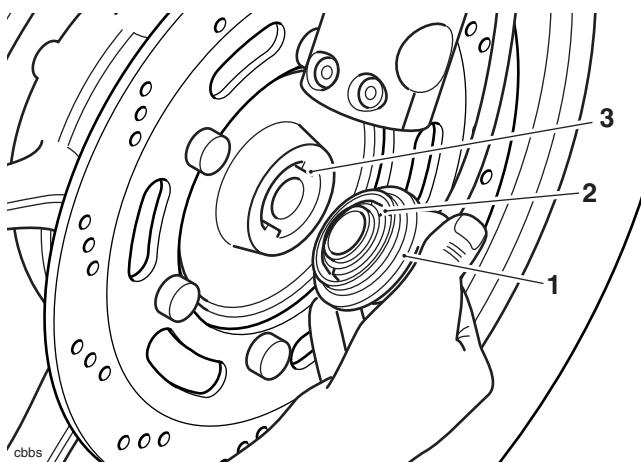
1. Check the wheel bearings spin smoothly with no signs of play. If not, renew both bearings.
2. If fitted, inspect the speedometer drive and its driveplate for signs of wear or damage. Renew as necessary.

Installation - Speedmaster, America and America LT with Cast Wheels

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 small spacer to the right side of the wheel.

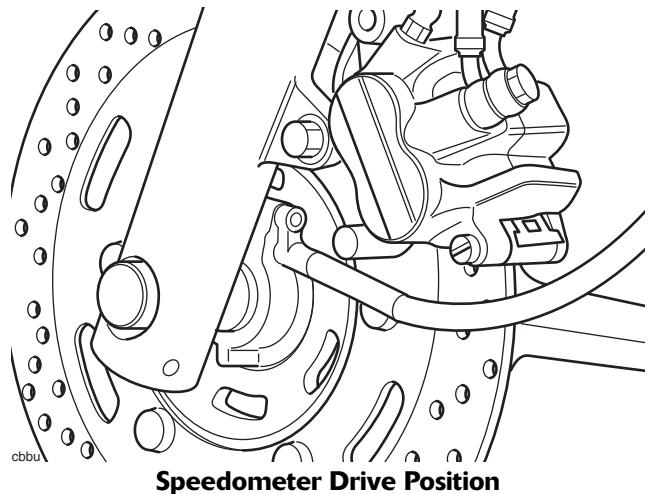


1. **Spacer**
4. **Models with cable driven speedometer only:** Align the speedometer drive gear cut-outs with the driveplate tabs and fit the drive to the left side of the wheel.

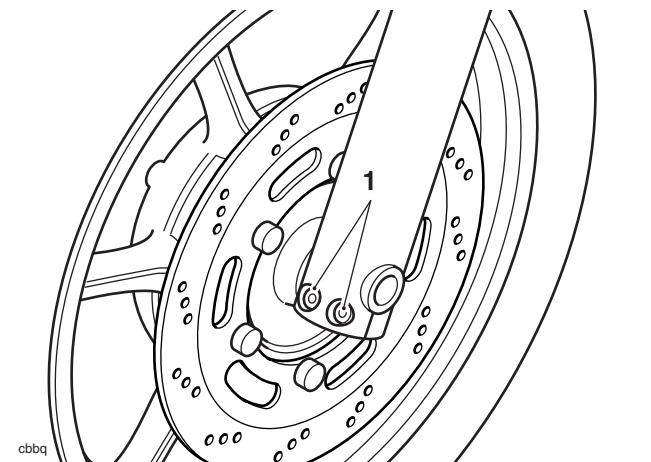


1. **Speedometer drive**
2. **Drive cut-outs**
3. **Driveplate tabs**
5. **Models with electronic speedometer only:** Fit the large spacer to the left side of the wheel.
6. **All models:** Align the wheel to the fitted position and insert the spindle from the left hand side.
7. On the right hand side, fit the bolt to the spindle and tighten to:
60 Nm for all models except Speedmaster from VIN 649050.
95 Nm for Speedmaster from VIN 649050.

8. Slide the displaced caliper onto the disc, ensure the pads pass either side, and fit the mounting bolts. Tighten the caliper mounting bolts to **28 Nm**.
9. Lower the motorcycle to the ground and park on the side stand.
10. Ensure the speedometer drive is positioned as shown below.



11. Pump the front forks a few times then tighten the spindle clamp bolt to **22 Nm**.



1. **Spindle clamp bolts**
12. Park the motorcycle on the side stand.
13. Operate the front brake several times to realign the brake pads.

Wheels & Tyres

Rear Wheel

Removal - America, America LT & 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

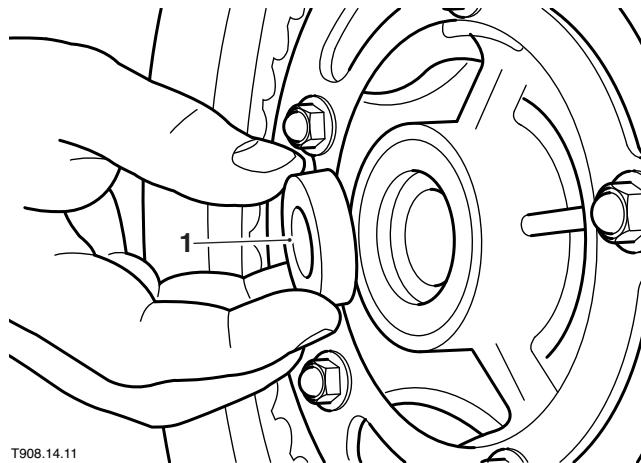
Do not fully release the chain adjusters before removing the wheel spindle. A fully released adjuster bolt can drag on the wheel spindle during removal resulting in a scored and damaged spindle.

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.



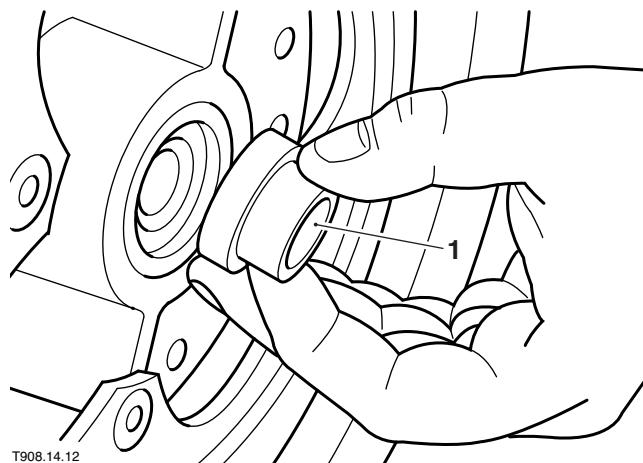
T908.14.11
1. Spacer

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.

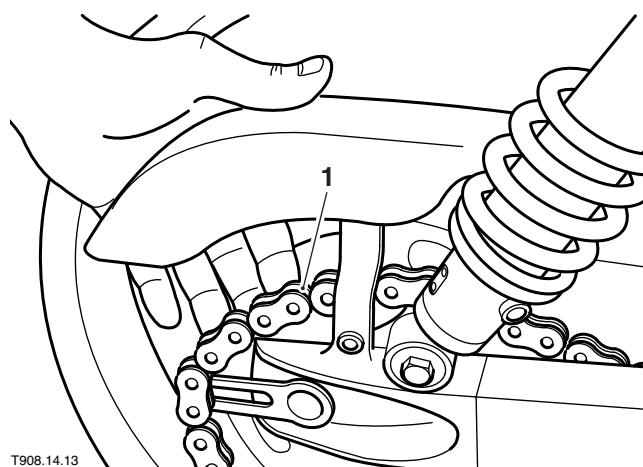
Installation - America, America LT & Speedmaster

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.



1. Spacer

3. Position the wheel in between the swinging arm and engage the chain with the sprocket.



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 free play (see final drive section).
10. Tighten the spindle nut to **110 Nm**.
11. Tighten the adjusters, anti-clockwise, to **2 Nm**.

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16 Frame & Bodywork

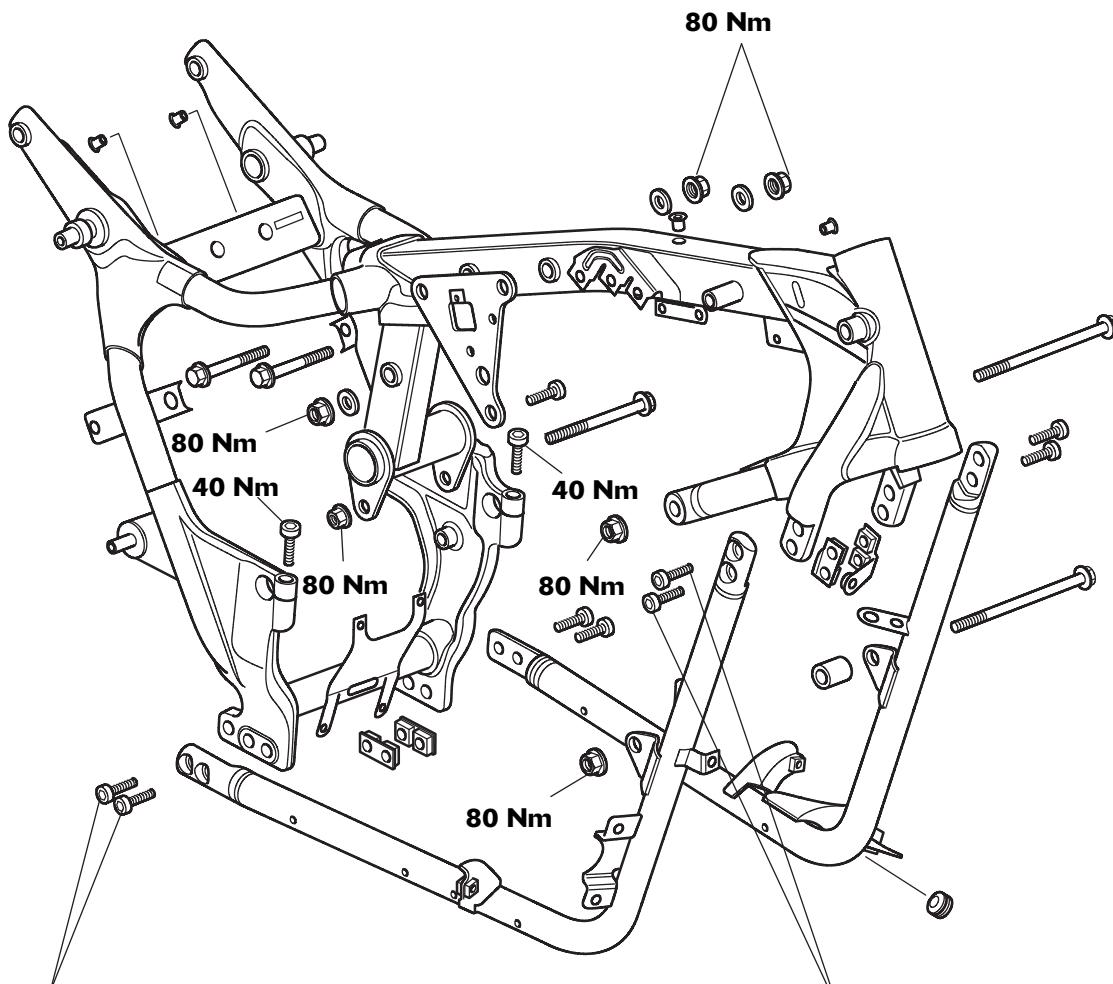
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Exploded View - Frame & Fixings - America, America LT & Speedmaster



55 Nm (black bolts up to VIN 333839)

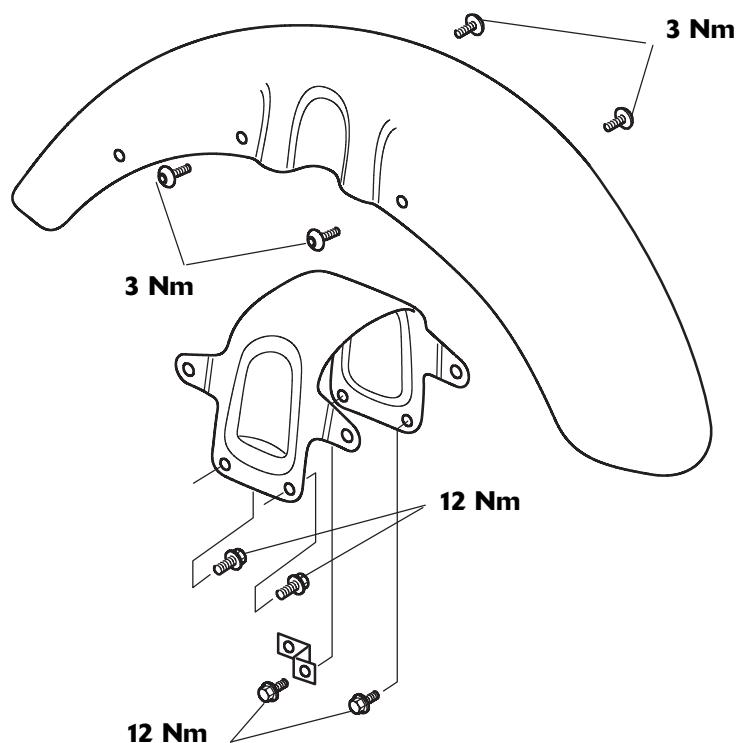
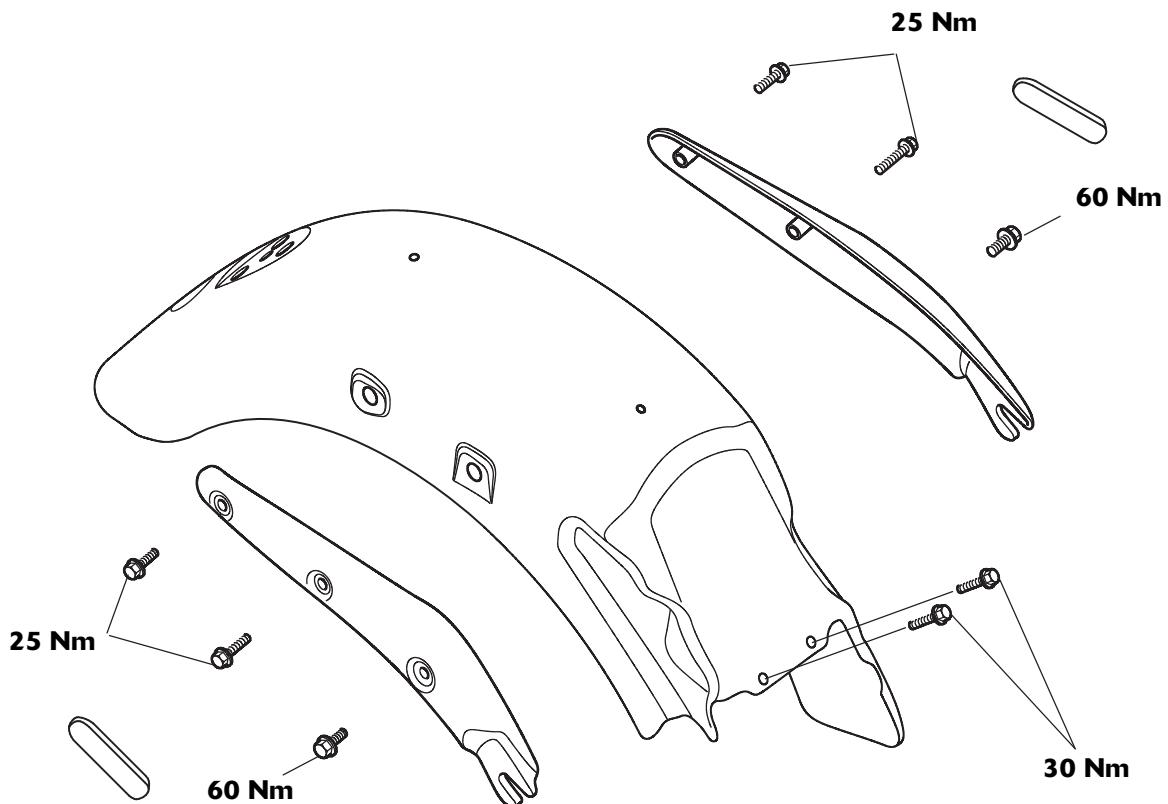
40 Nm (silver bolts from VIN 333840)

55 Nm (black bolts up to VIN 333839)

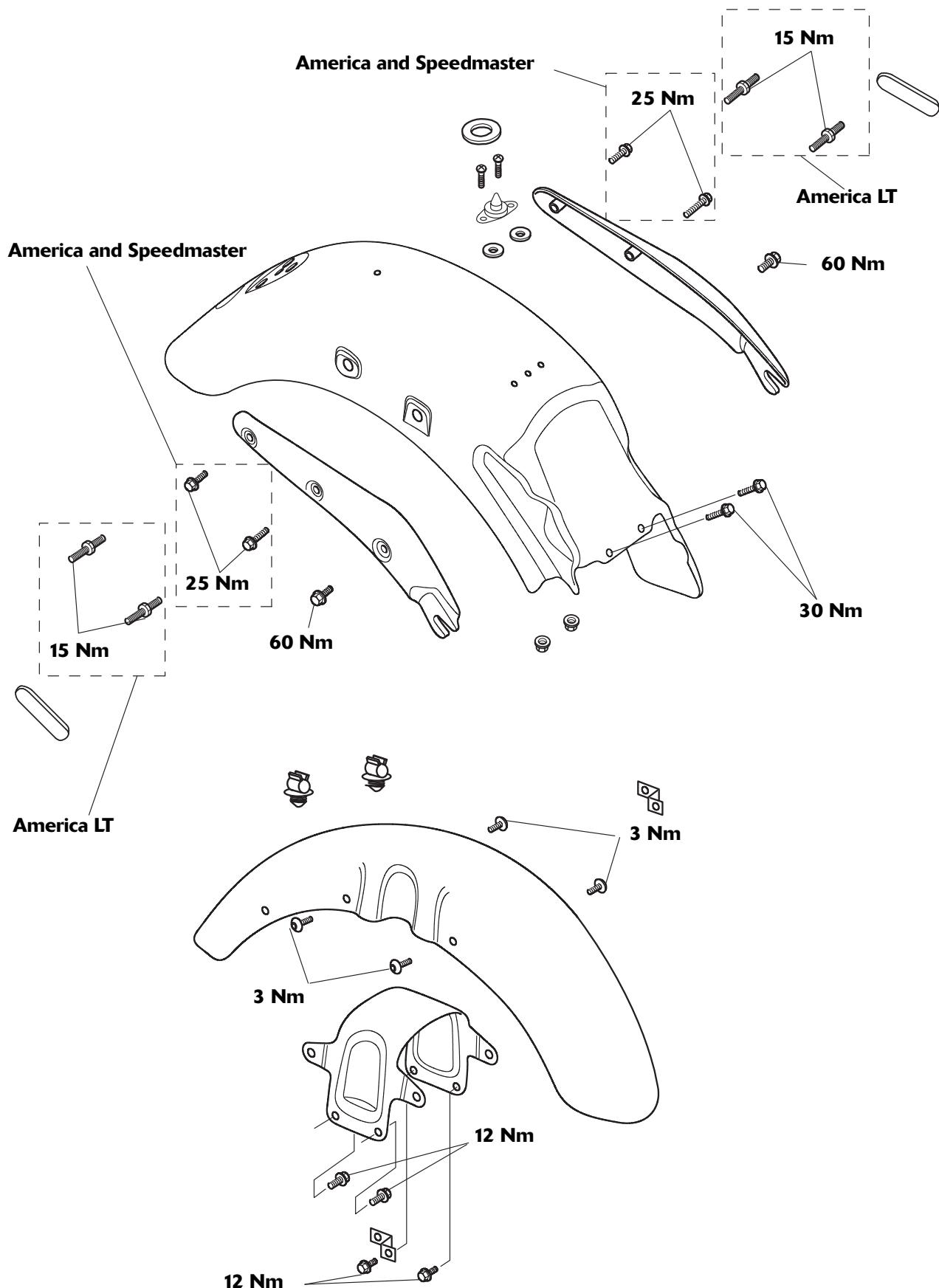
40 Nm (silver bolts from VIN 333840)

Frame & Bodywork

Exploded View - Front and Rear Mudguards - America up to VIN 468389 & Speedmaster up to VIN 469049

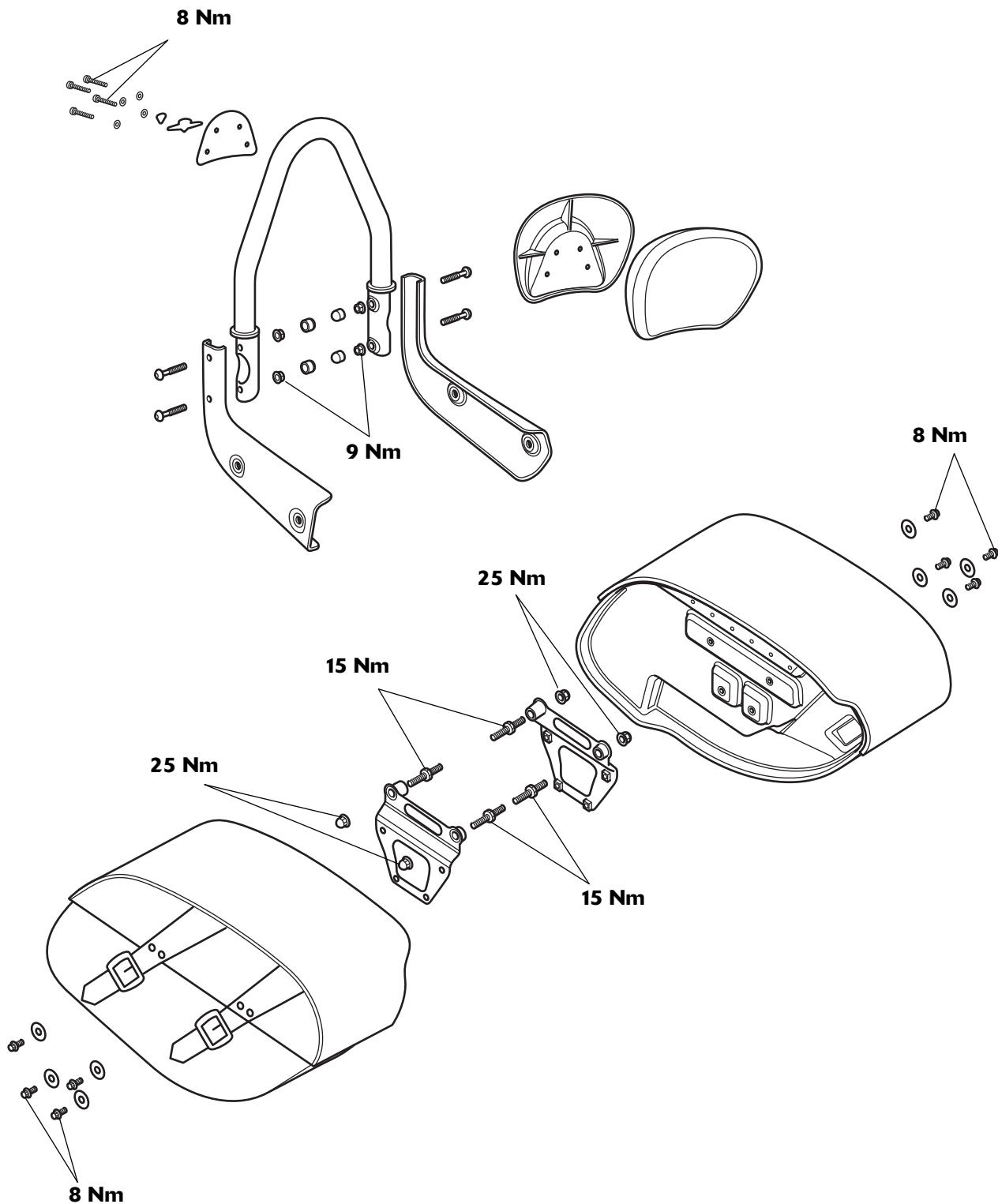


Exploded View - Front and Rear Mudguards - America and America LT from VIN 468390 & Speedmaster from VIN 469050

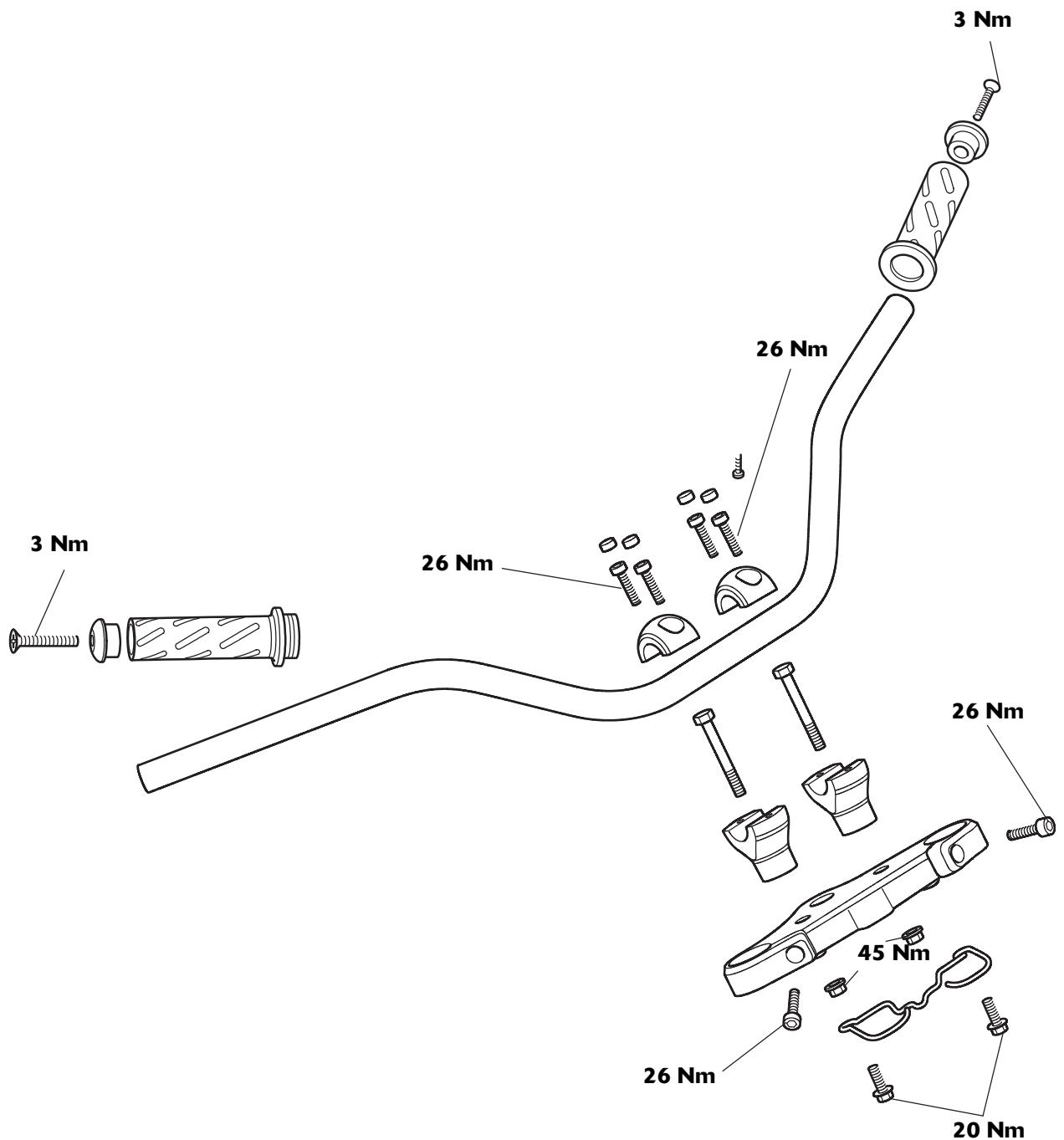


Frame & Bodywork

Exploded View - Panniers and Passenger Backrest - America LT

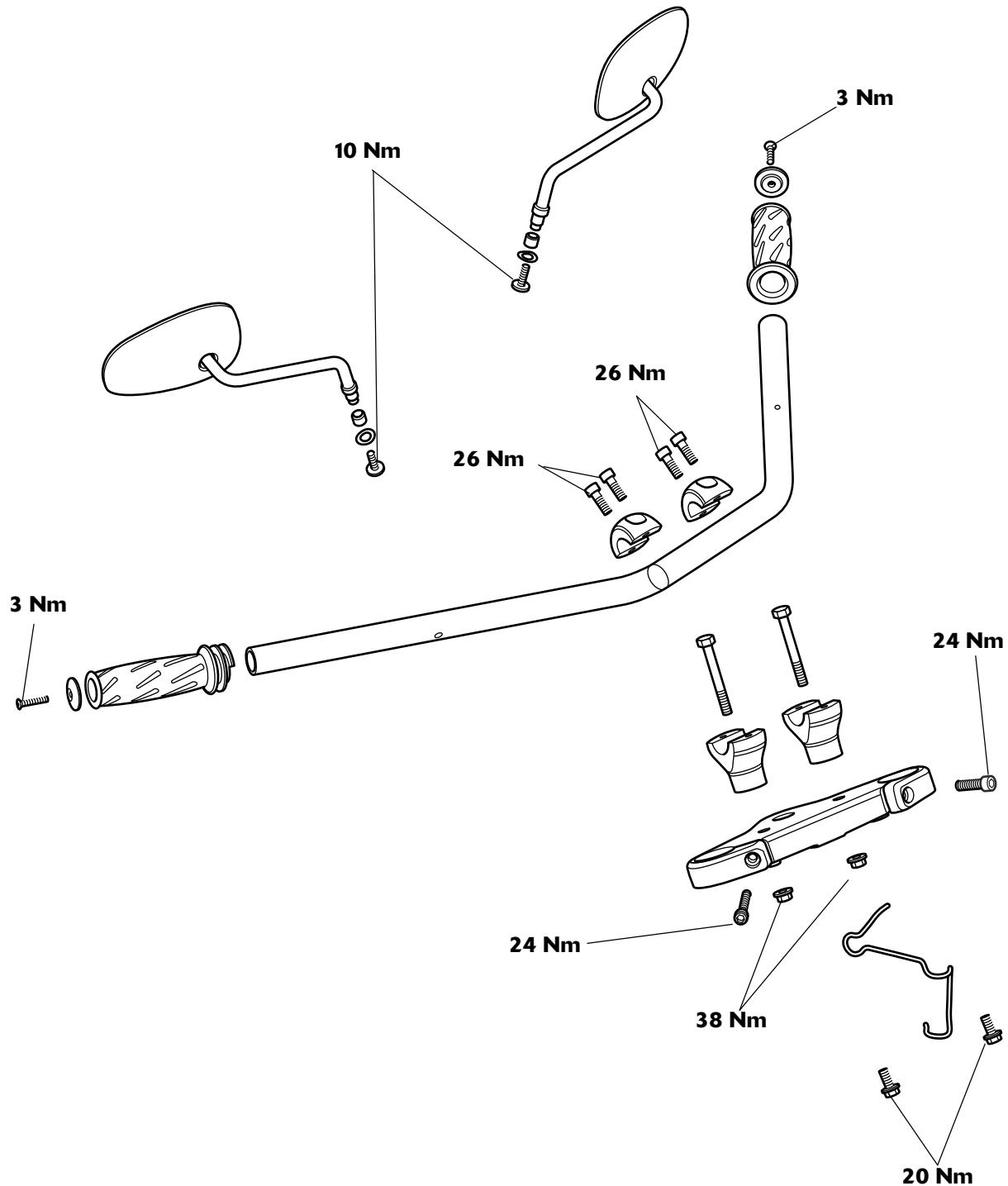


Exploded View - Handlebars - America - up to VIN 468389

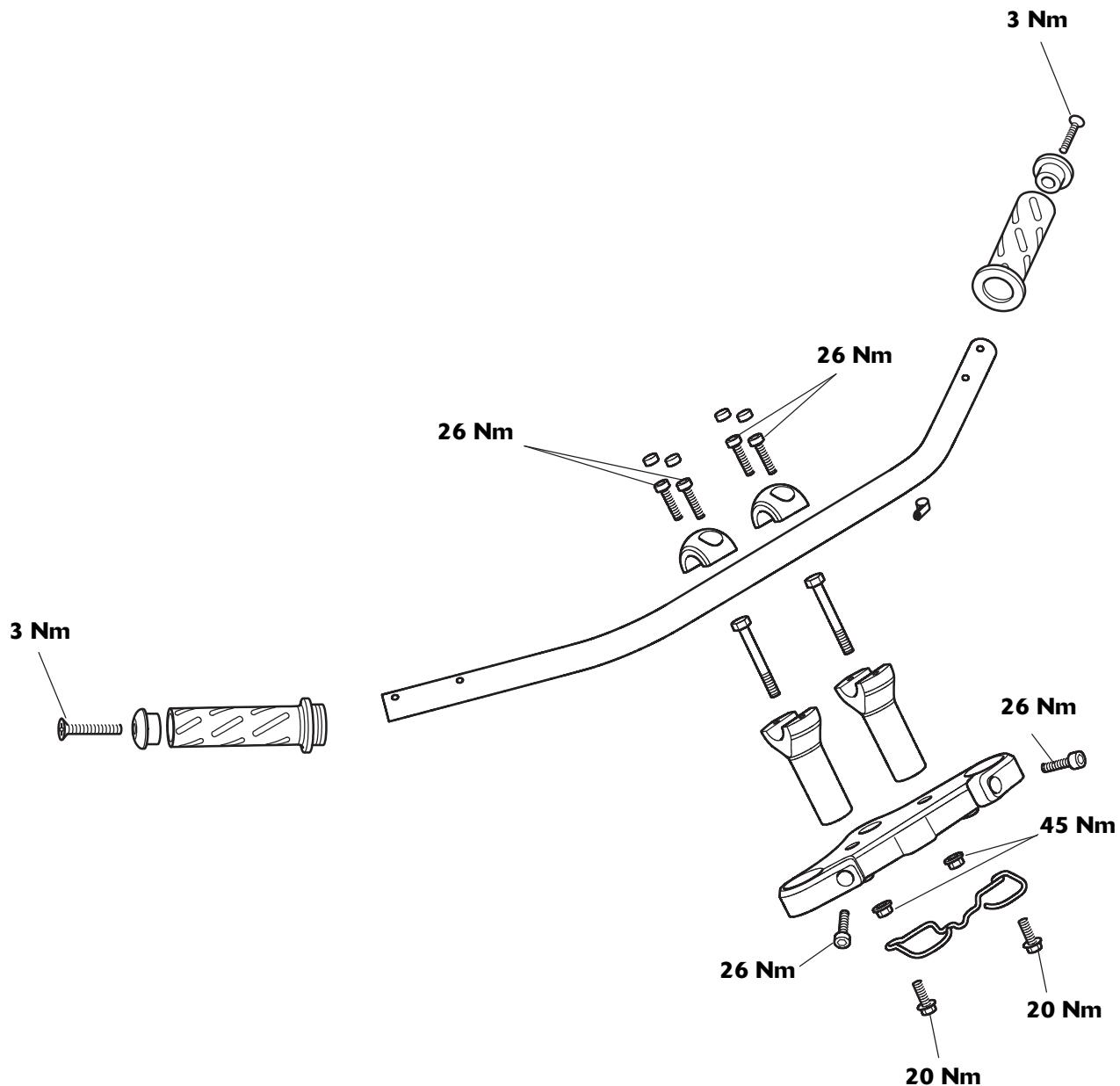


Frame & Bodywork

Exploded View - Handlebars - America and America LT - from VIN 468390

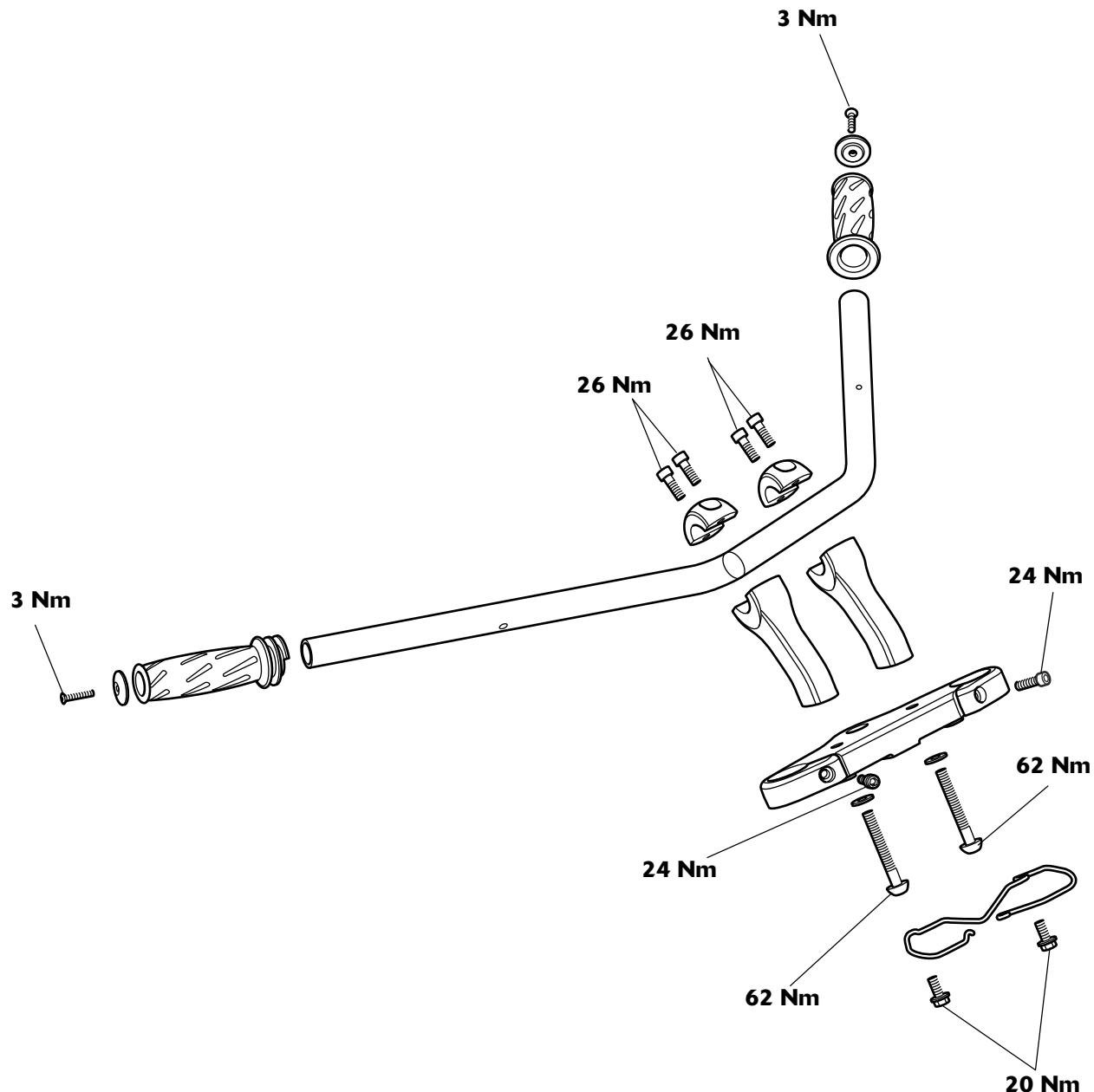


Exploded View - Handlebars - Speedmaster - up to VIN 369049

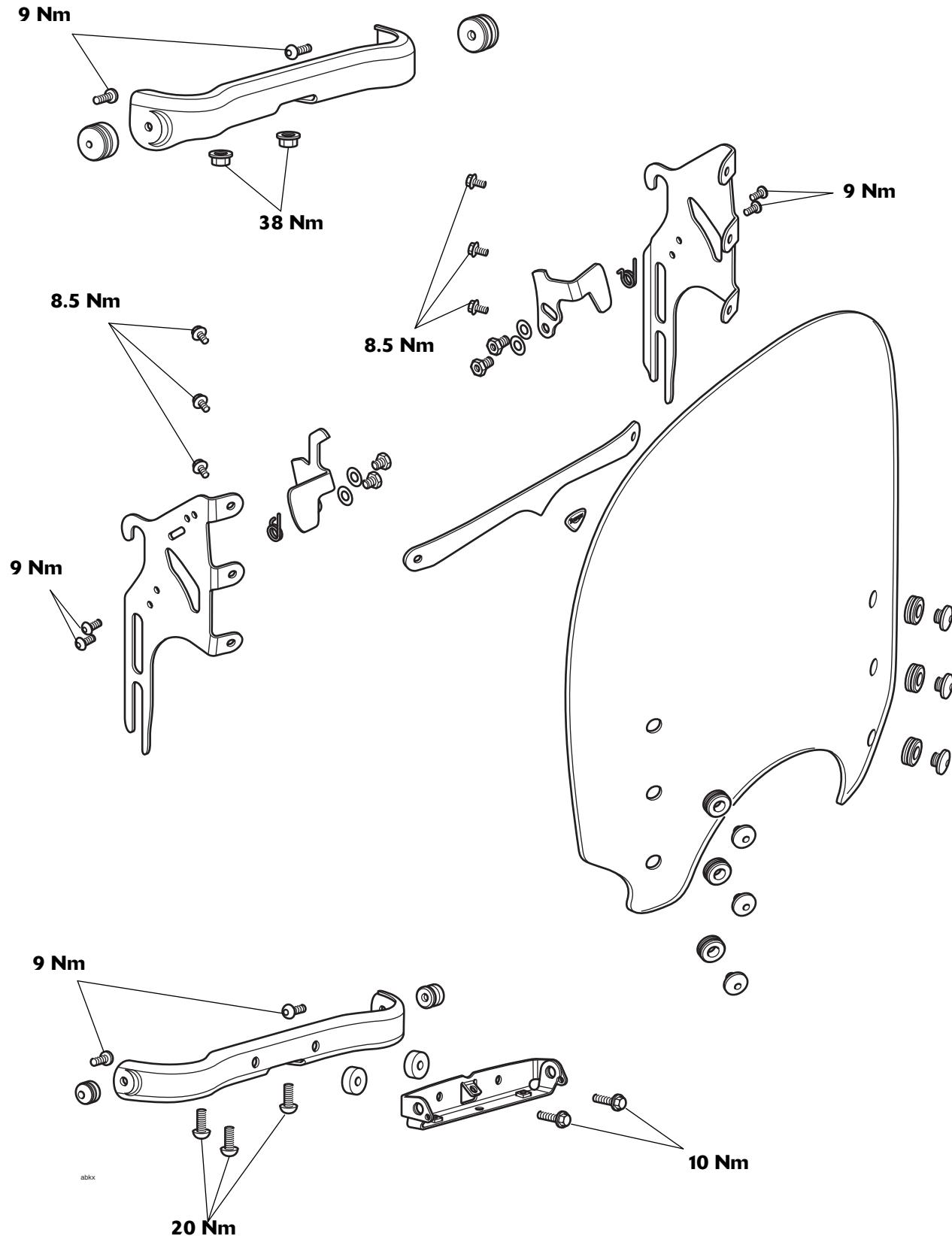


Frame & Bodywork

Exploded View - Handlebars - Speedmaster - from VIN 369050

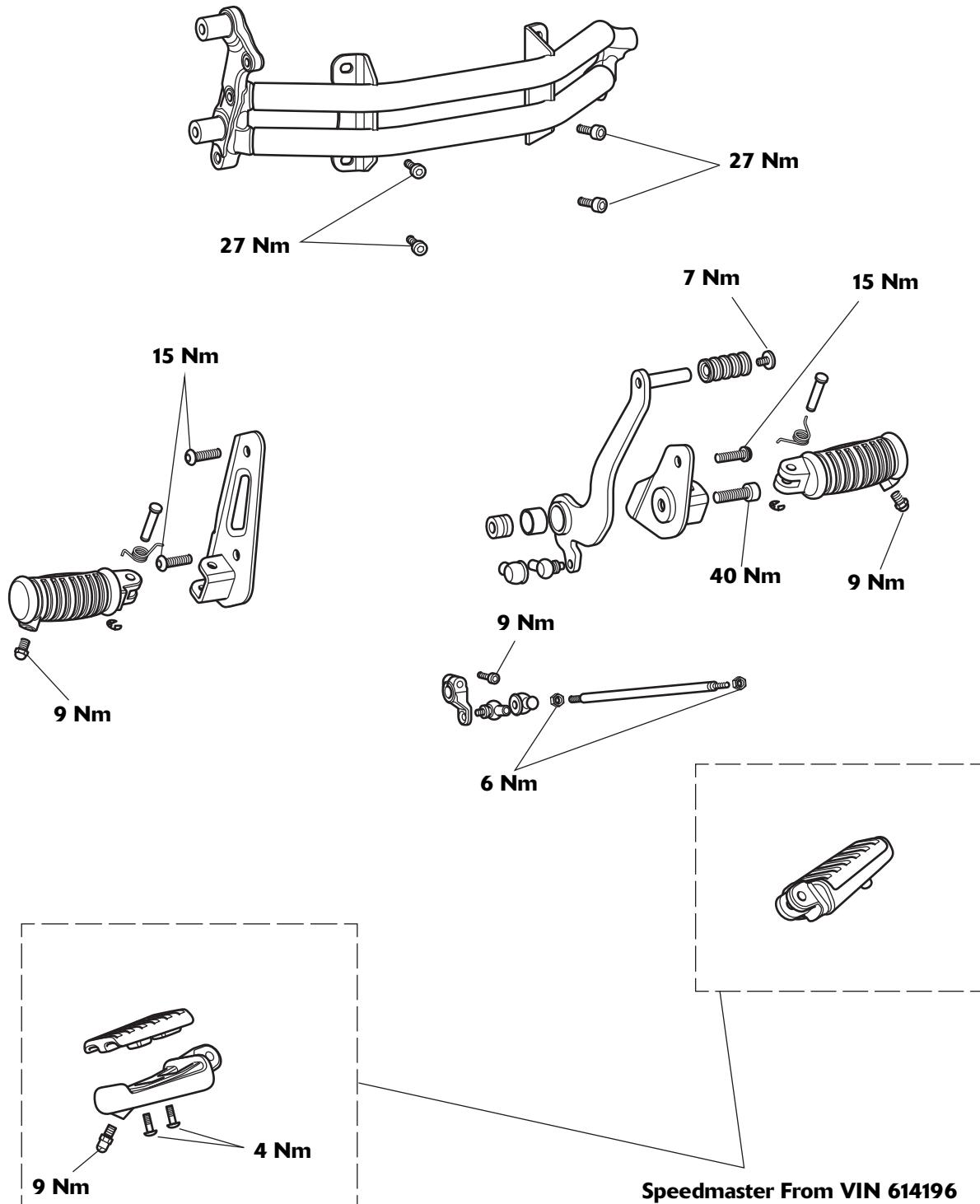


Exploded View - Windscreen - America LT

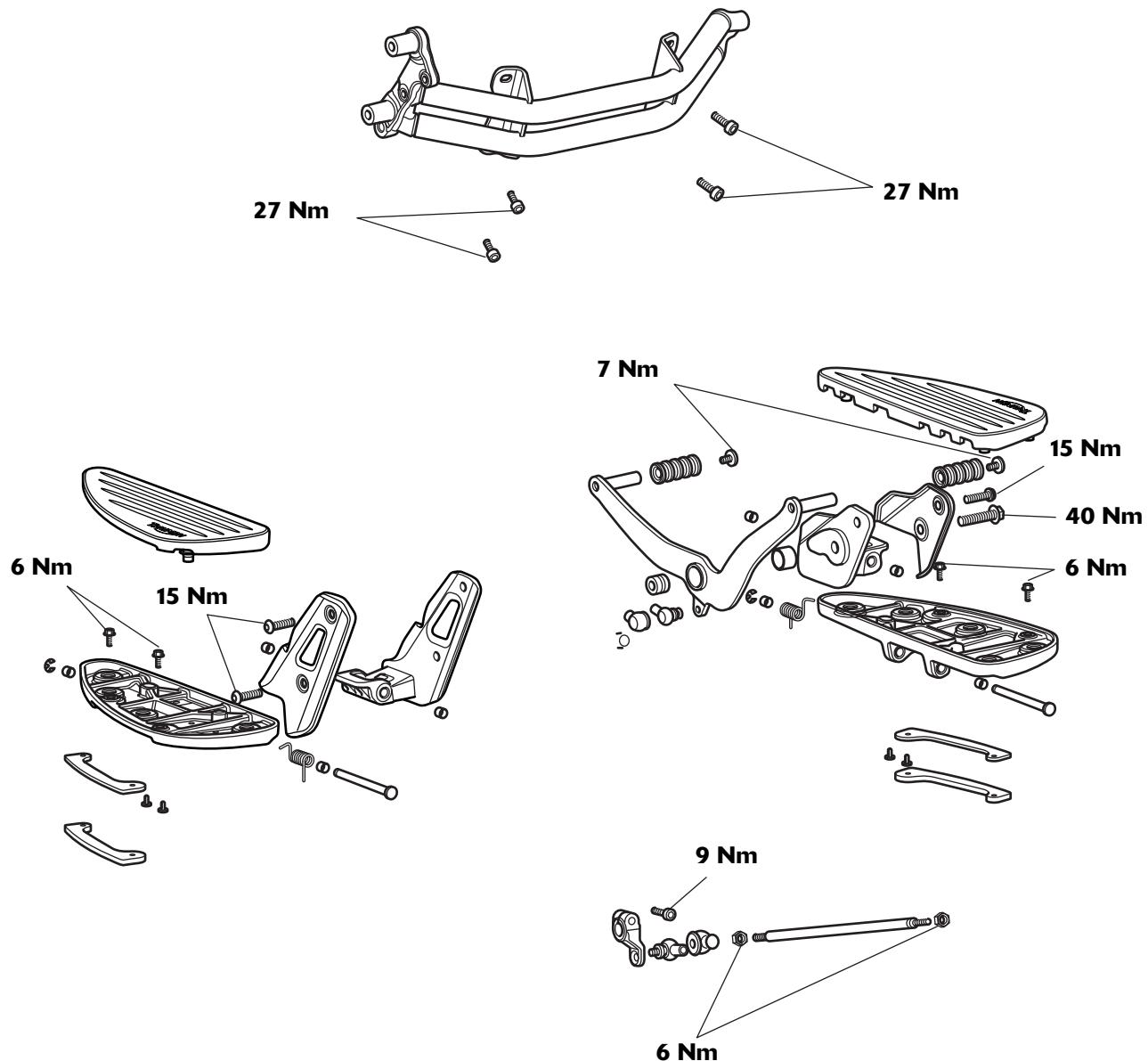


Frame & Bodywork

**Exploded View - Rider Foot Controls - America up to VIN 611104 and
VIN 611134, Speedmaster up to VIN 614195 and Speedmaster from
VIN 614196**



Exploded View - Rider Foot Controls - America and America LT from VIN 611105 (except VIN 611134)



Frame & Bodywork

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.

Bank Angle Indicators



Warning

Use of a motorcycle with bank angle indicators worn beyond the maximum limit (as described below) will allow the motorcycle to be banked to an unsafe angle.

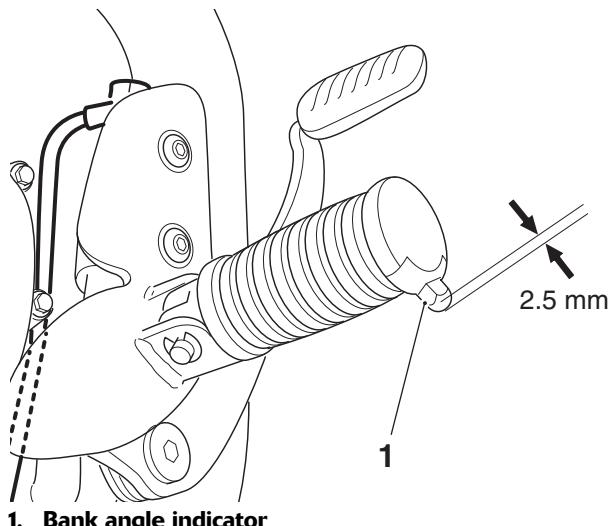
Banking to an unsafe angle may cause instability, loss of motorcycle control and an accident causing injury or death.

America up to VIN 611105 and VIN 611134 Speedmaster up to VIN 614195

Bank angle indicators are located on the riders footrests.

Regularly check the bank angle indicators for wear.

Replace the bank angle indicators when the bank angle indicator is worn beyond the maximum limit (when less than 2.5 mm of the domed tip of the indicator remains).

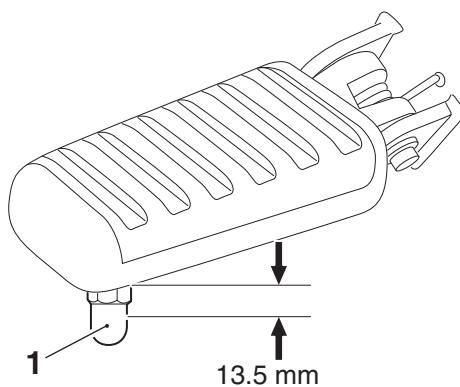


Speedmaster from VIN 614196

Bank angle indicators are located on the riders footrests.

Regularly check the bank angle indicators for wear.

Replace the bank angle indicators when the bank angle indicator is worn beyond the maximum limit (when the bank angle indicator is worn to a minimum of 13.5 mm in length).



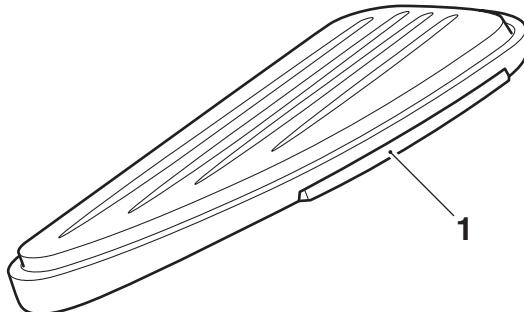
1. Bank angle indicator

America and America LT from VIN 611105 (except VIN 611134)

The bank angle indicators are located on the outer edge of the riders footboards.

Inspect the bank angle indicators for wear on the outer edge.

Replace the bank angle indicator when it is worn before the footboard starts to get damaged.



1. Bank angle indicator



Warning

When banking and the bank angle indicator, attached to the riders footboard, makes contact with the ground, the motorcycle is nearing its bank angle limit. A further increase of the banking angle is unsafe.

Banking to an unsafe angle may cause instability, loss of motorcycle control and an accident.



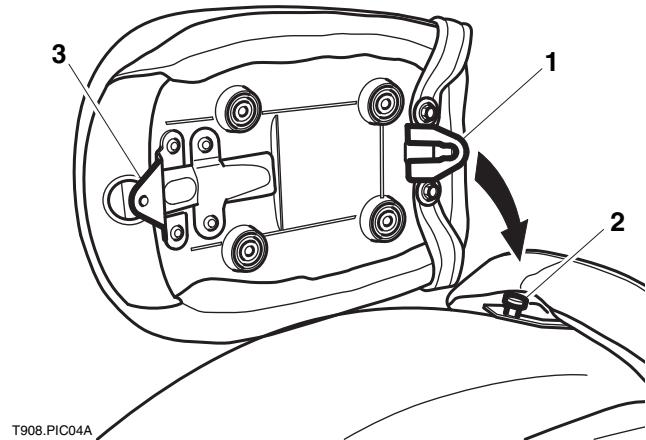
Warning

The bank angle indicators 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.

Seats

Removal - America up to VIN 468389

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).



1. Rear-seat front-bracket

2. Front seat fixing

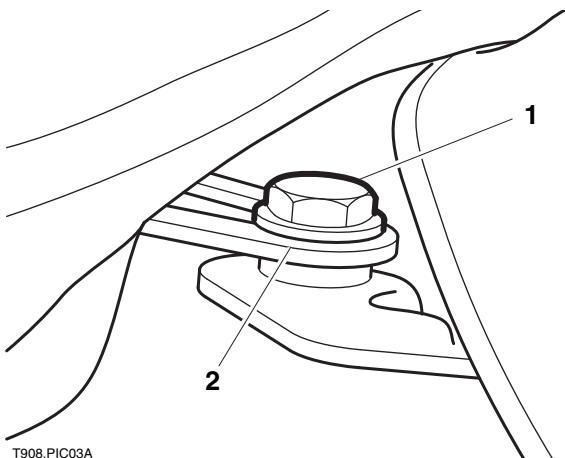
3. Rear-seat rear-bracket

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.

Frame & Bodywork

Installation - America up to VIN 468389

1. Fit the front seat, ensuring it is correctly located behind the fuel tank, fit a new screw and tighten 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**.

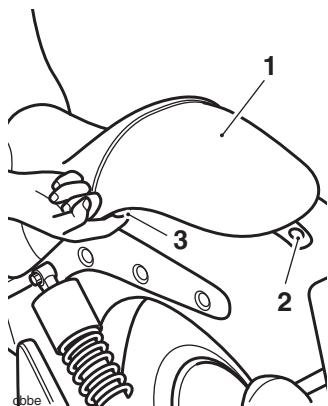


T908.PIC03A

1. **Front seat fixing**
2. **Rear-seat front-bracket**

Removal - America, America LT and Speedmaster from VIN 468390

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 - America, America LT and Speedmaster from VIN 468390

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

- The right hand side cover is retained by bayonets.



- Cover**
- Bayonets**

- Free the side cover by gently pulling outwards.

Installation

- Ensure the mounting rubbers are all correctly fitted in the frame brackets and are in good condition.
- Install the cover, engaging its bayonet feet into the mounting rubbers.

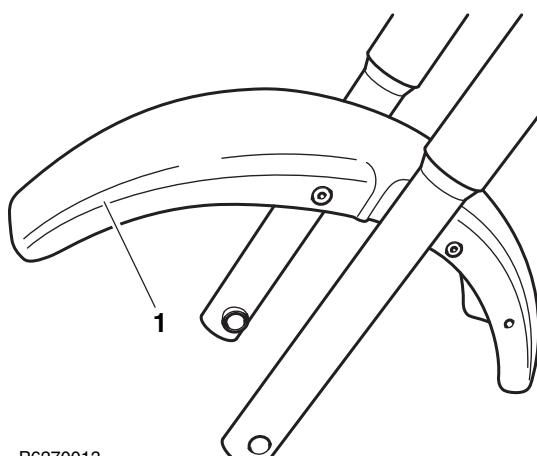
Front Mudguard

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.

- Remove the front wheel (see page 15-17 for models with spoked wheels and page 15-20 for models with cast wheels).
- 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.
- Remove the mudguard assembly from the motorcycle taking care not to damage the painted surface.



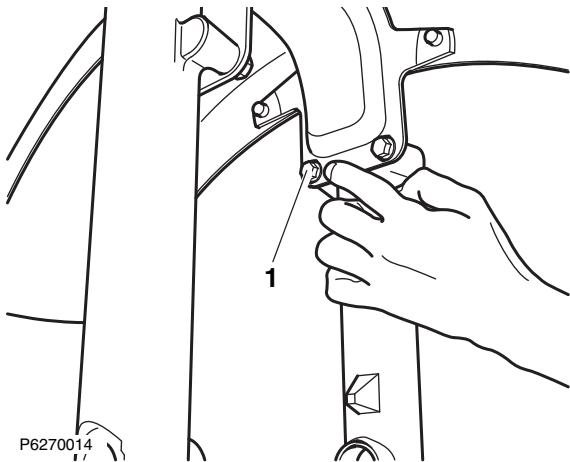
- Front mudguard**

- If necessary, undo the bolts and separate the bracket and mudguard.

Frame & Bodywork

Installation

- Where necessary, assemble the mudguard and mounting bracket off the motorcycle. Tighten the fixings to **3 Nm**.
- 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.



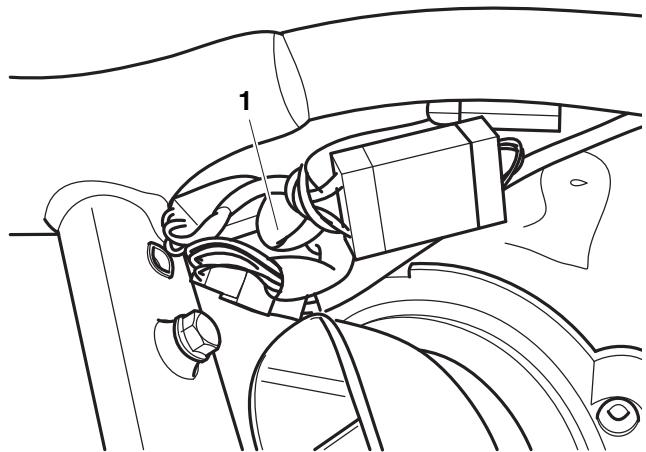
1. Brake hose bracket fixing point

- Tighten the bolts securing the mudguard to the forks to **12 Nm**.
- Refit the front wheel (see page 15-18 for models with spoked wheels and page 15-21 for models with cast wheels).

Rear Mudguard

Removal

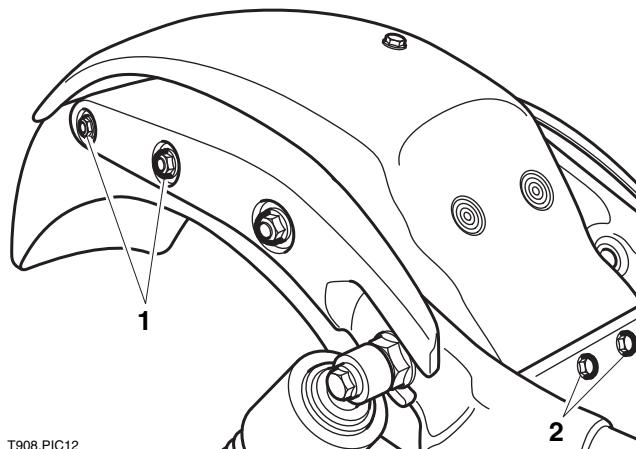
- Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for America, America LT and Speedmaster from VIN 468390).
- America LT only:** Remove the following:
 - Panniers (see page 16-24).
 - Pannier mountings and passenger backrest (see page 16-25).
- Disconnect the battery, negative (black) lead first.
- Remove the airbox top cover.
- Disconnect the rear light and indicator wiring at their junctions with the main harness.



1. Rear light wiring connector location

- America LT:** Release the four threaded studs securing the mudguard assembly to the frame brackets. Note the orientation of the front and rear threaded studs for installation.

7. **America and Speedmaster:** Release the four fixings and washers securing the mudguard assembly to the frame brackets.



1. Mudguard to bracket fixings (America and Speedmaster shown)

2. Mudguard to frame cross tube fixings

8. Release the two fixings securing the mudguard assembly to the frame cross tube and remove the mudguard, taking care not to damage its painted finish.

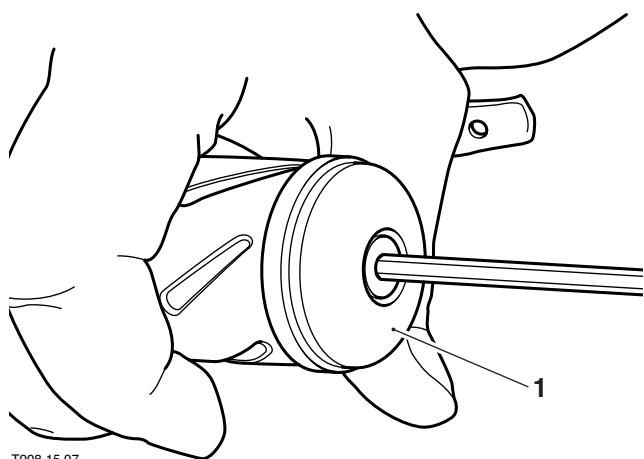
Installation

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. **America and Speedmaster:** Locate the mudguard correctly to its brackets then fit the four mudguard to bracket fixings. Tighten to **25 Nm**.
4. **America LT:** Locate the mudguard correctly to its brackets then fit the four mudguard to bracket threaded studs, ensuring correct orientation as noted during removal. Tighten to **15 Nm**.
5. Fit the two mudguard to frame screws. Tighten to **30 Nm**.
6. Reconnect the rear light and indicator wiring.
7. Reconnect the battery, positive (red) lead first.
8. Check the operation of the rear light and indicators.
9. **America LT only:** Refit the following:
 - Pannier mountings and passenger backrest (see page 16-25).
 - Panniers (see page 16-24).
10. Refit the seats (see page 16-16).

Handlebar

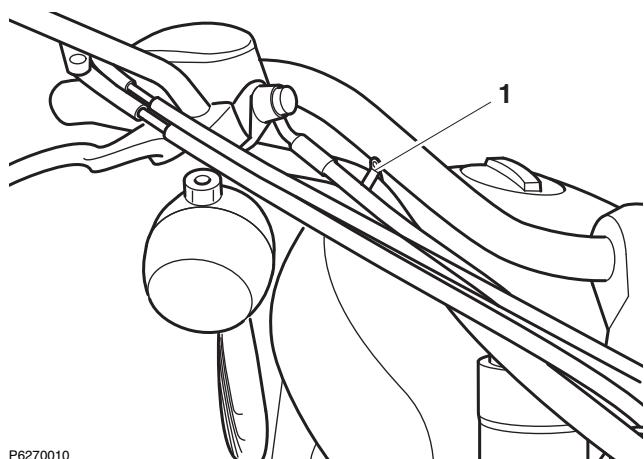
Removal

1. **America LT only:** Remove the windscreen (see page 16-26).
2. Undo the screws and remove the end weights from the handlebars.



T908.15.07
1. End weight

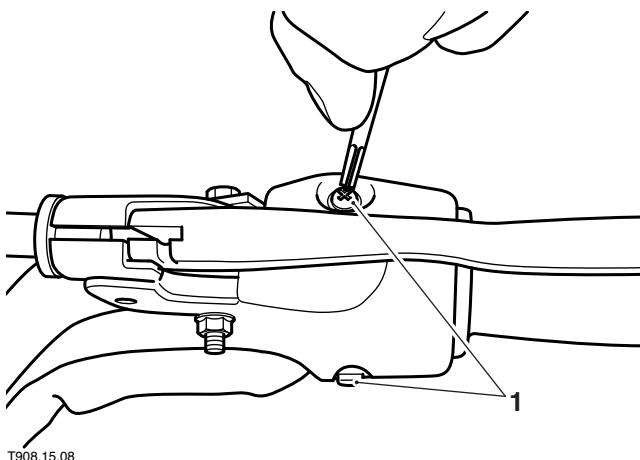
3. **For America up to VIN 468389 and Speedmaster up to VIN 469089 only:** Release the wiring from its clips on either side of the handlebar.



**P6270010
1. Wiring clip (America shown)**

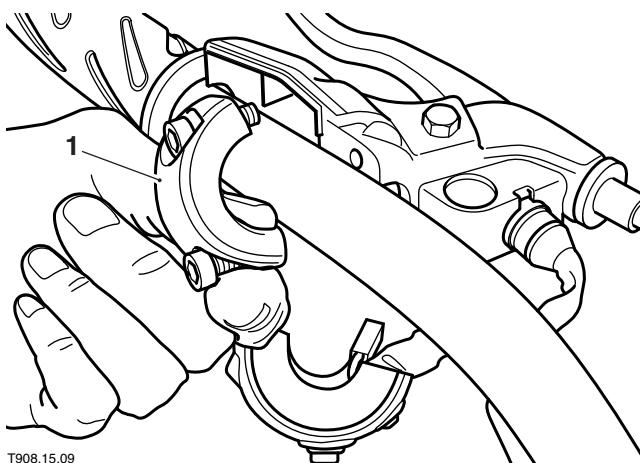
Frame & Bodywork

4. Undo the screws and free the left switchgear assembly from the handlebar.



1. Switch screws

5. Unscrew the bolts and remove the mounting clamp from the clutch lever assembly. Position the lever clear.

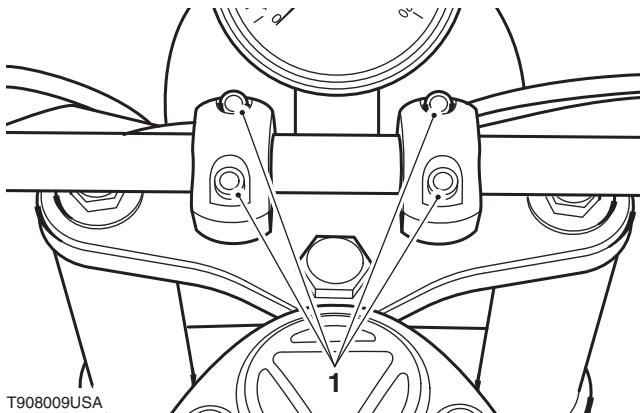


1. Mounting clamp

6. Undo the screws and free the right switchgear assembly from the master cylinder. Free the switch wiring from the handlebars.
7. Unscrew the bolts and remove the mounting clamp from the master cylinder.
8. 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.

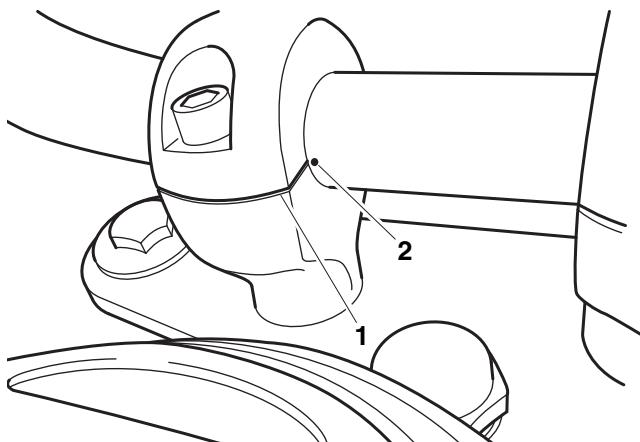


1. Handlebar clamp bolts

9. Free the handlebar from the twist grip/master cylinder assembly and remove it from the motorcycle.
10. 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

- 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:
 - 45 Nm** for America up to VIN 468389 and Speedmaster up to VIN 369049.
 - 38 Nm** for America and America LT from VIN 468390.
 - 62 Nm** for Speedmaster from VIN 369050.
- Fit the throttle twist grip 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.
- Align the punch mark on the bar with the rear split of the left hand clamp then tighten the front clamp bolts to **26 Nm**, then the rear clamp bolts to **26 Nm**.

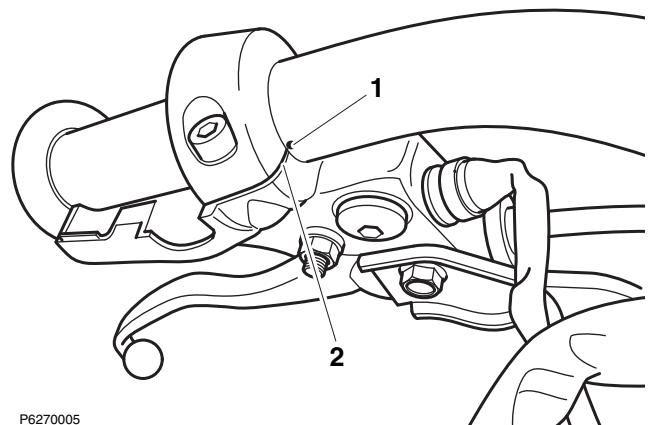


- 1. Clamp split line (America and America LT shown)**
2. Handlebar punch mark

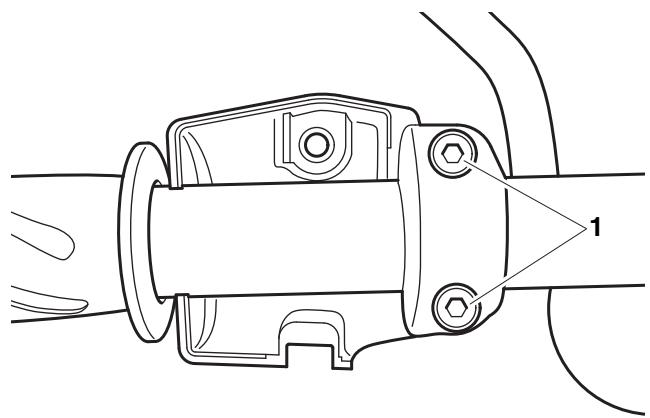
- Locate the clutch lever assembly on the handlebar and fit the mounting clamp.
 - America and America LT - align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **12 Nm**.
 - Speedmaster - align the clamp upper split with the punch mark on the handlebar then evenly tighten the clamp bolts to **12 Nm**.

Note:

- America and America LT punch mark illustrated.**



- 1. Handlebar dot mark**
2. Clamp split line



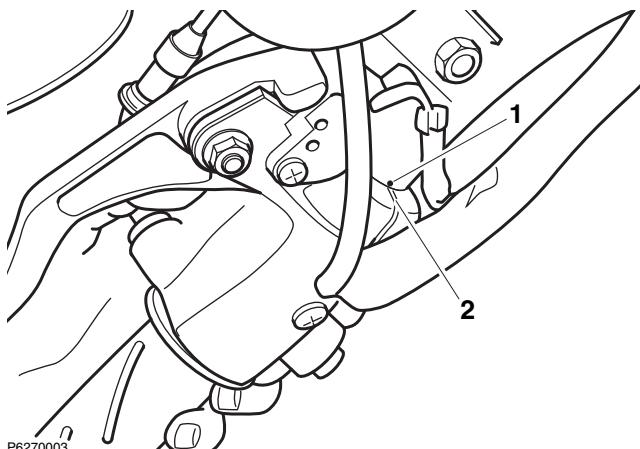
- 1. Clutch lever clamp bolts**
5. Fit the mounting clamp to the master cylinder.

- America and America LT - align the clamp lower split with the punch mark on the handlebar then evenly tighten the clamp bolts to **12 Nm**.
- Speedmaster - align the clamp upper split with the punch mark on the handlebar then evenly tighten the clamp bolts to **12 Nm**.

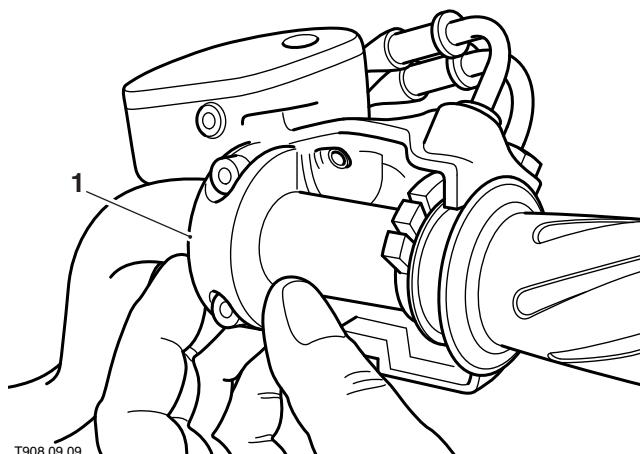
Frame & Bodywork

Note:

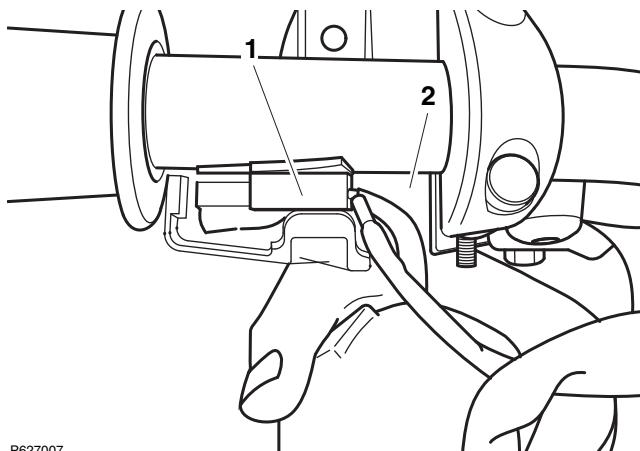
- America and America LT punch mark illustrated.



1. Handlebar dot mark
2. Clamp split line

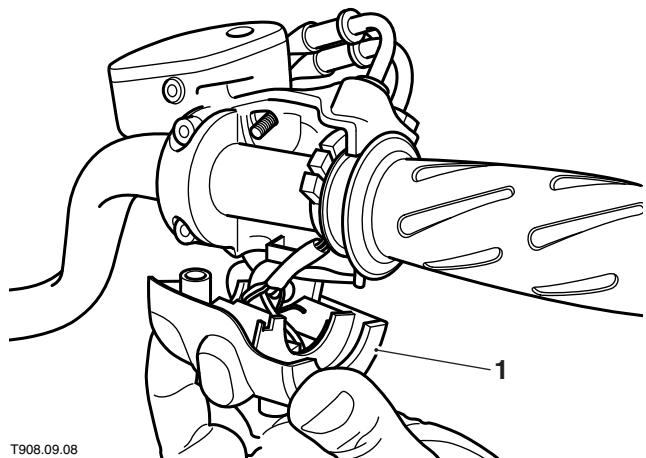


1. Master cylinder mounting clamp
6. America up to VIN 468389 and Speedmaster only: Tuck the indicator wiring connectors into the recess in the front half of the switchgear.



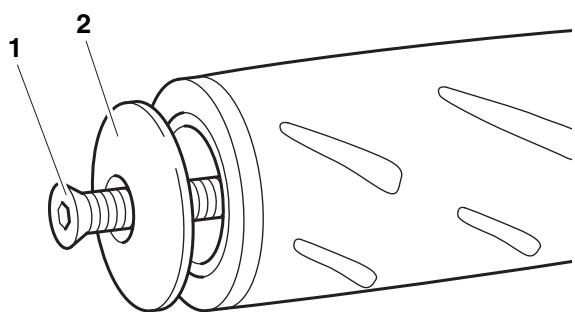
1. Cable connector
2. Recess

7. Refit the left and right switchgear assemblies, tightening their screws to **2.5 Nm**.



1. Right hand switchgear assembly

8. Insert the handlebar end weights into the handlebar ends and secure with the two M5 x 30 mm fixings. Tighten to **3 Nm**.



P6270008

1. Fixing
2. End weight
9. America LT only: Refit the windscreen (see page 16-26).

Side Stand

Removal

- 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.

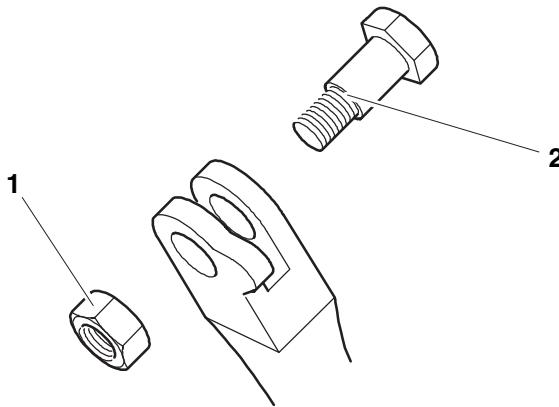
- Unhook the spring from the side stand and remove it from the motorcycle.



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.

- Unscrew the nut from the side stand pivot bolt.



1. Nut

2. Pivot bolt

- Unscrew the pivot bolt and remove the stand from the bike.

Installation

- Lubricate the pivot bolt shoulder and side stand pivot with multi-purpose grease.
- Fit the stand to the bike and insert the pivot bolt, tightening it **25 Nm**.
- Fit the lock nut to the pivot bolt and tighten it to **25 Nm**.
- 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.

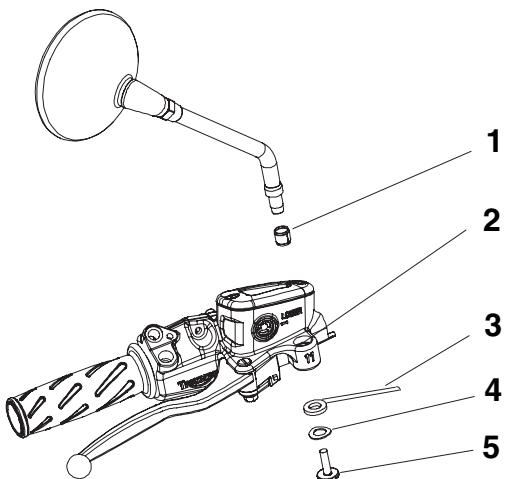
- Check the operation of the side stand before riding the motorcycle. Ensure the spring holds the stand securely in the retracted position.

Frame & Bodywork

Mirrors

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. **Tool T3880007**
4. **Wavy Washer**
5. **Mirror screw**

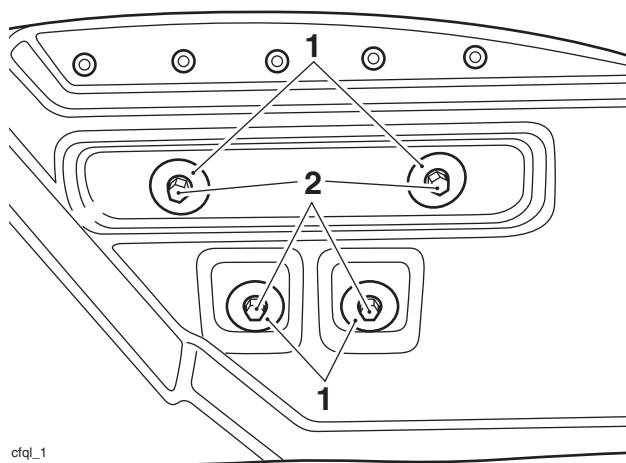
Installation

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**.

Panniers - America LT

Removal

1. Working inside the left hand pannier, release the four fixings and collect the flanged sleeves. Remove the pannier from its mounting bracket.
2. Repeat step 1 for the right hand pannier.



1. **Flanged Sleeves**
2. **Fixings**

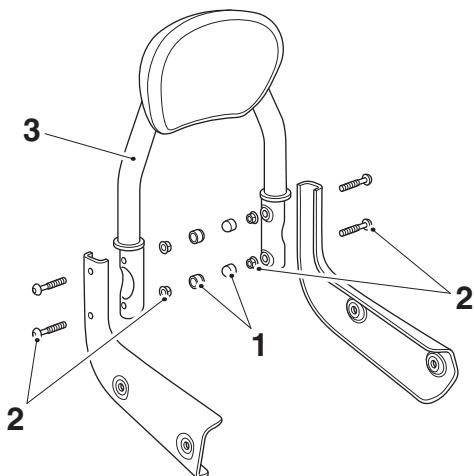
Installation

1. Working inside the left hand pannier, fit the flanged sleeves into the holes in the rear panel of the pannier.
2. Align the left hand pannier to its mounting bracket and secure using the original fixings. Tighten the fixings to **8 Nm**.
3. Repeat steps 1 and 2 for the right hand pannier.

Pannier Mountings and Passenger Backrest - America LT

Removal

1. Remove the seat (see page 16-16).
2. Remove the panniers (see page 16-24).
3. Remove the caps from the passenger backrest mounting fixings.
4. Release the fixings and remove the passenger backrest.

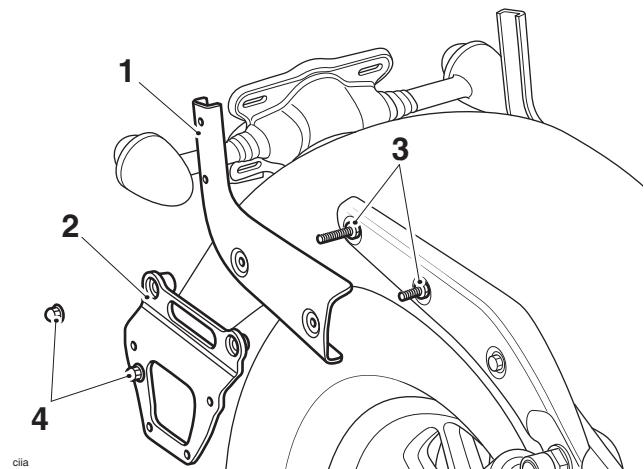


- 1. Caps**
2. Fixings
3. Passenger backrest

5. Release the fixings and remove the right hand pannier mounting bracket and passenger backrest bracket from the threaded studs.

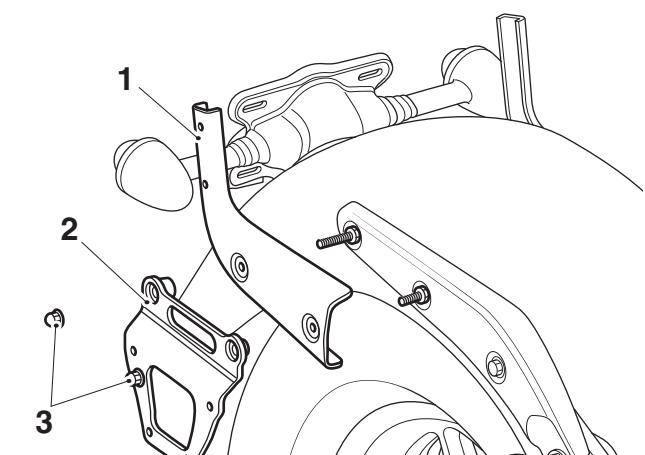
Installation

1. Fit the right hand passenger backrest bracket and pannier mounting bracket to the threaded studs as shown below. Secure using the original fixings. Do not fully tighten at this stage.



- 1. Passenger backrest bracket (right hand side shown)**
2. Pannier mounting bracket
3. Threaded stud
4. Fixings

2. Repeat step 1 for the left hand brackets.
3. Locate the passenger backrest into the mounting brackets and secure using the original fixings. Do not fully tighten at this stage.
4. When satisfied that the passenger backrest assembly is aligned correctly on the motorcycle, tighten the fixings to **9 Nm**.
5. Tighten the pannier mounting bracket fixings to **25 Nm**.
6. Refit the panniers (see page 16-24).
7. Refit the seat (see page 16-16).



- 1. Pannier mounting bracket (right hand side shown)**
2. Passenger backrest bracket
3. Fixings

6. Repeat step 5 for the left hand brackets.

Frame & Bodywork

Windscreen - America LT

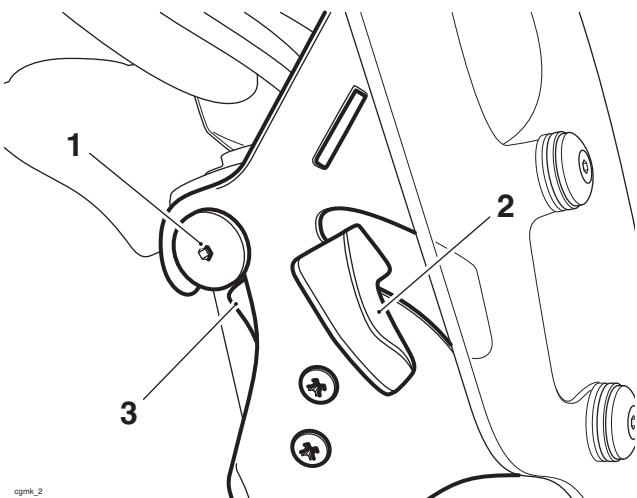
Removal



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. To remove the windscreen, stand astride the front wheel. Pull the latch handles towards the windscreen to release the latches from the upper mounting points.



1. Upper mounting (right hand side shown)

2. Latch handle

3. Latch

2. For complete removal from the motorcycle, lift the windscreen up until it is released from the upper and lower mounting points.

Installation

1. To install the windscreen, stand aside the front wheel and carefully align the windscreens mounting slots to the mounting points on the motorcycle.

Note:

- An audible click can be heard when the windscreens upper mountings are fully engaged.
2. Slide the windscreens down until the upper mounting latches have clicked into the locked position.
 3. Ensure both upper mounting latches are fully engaged in the locked position and the windscreens is secure.



Warning

To prevent detachment of the windscreens during riding, after fitting, always grasp the windscreens and pull firmly upwards. If the windscreens locks are not correctly secured the windscreens will detach from the locks. A loose or detached windscreens could cause loss of motorcycle control and an accident.

Windscreen Mounting Brackets - America LT

Removal

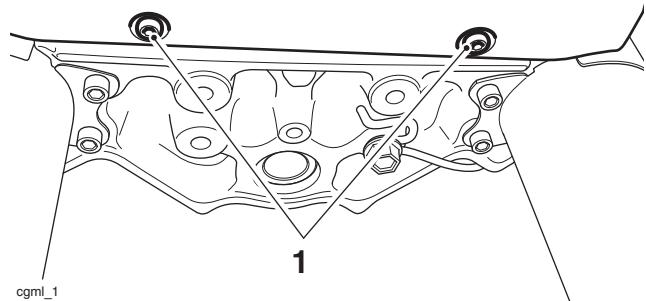
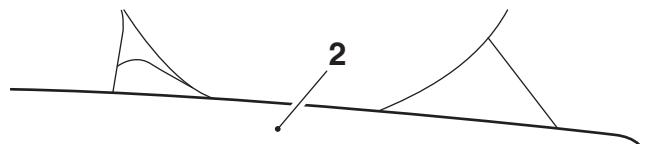


Warning

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.

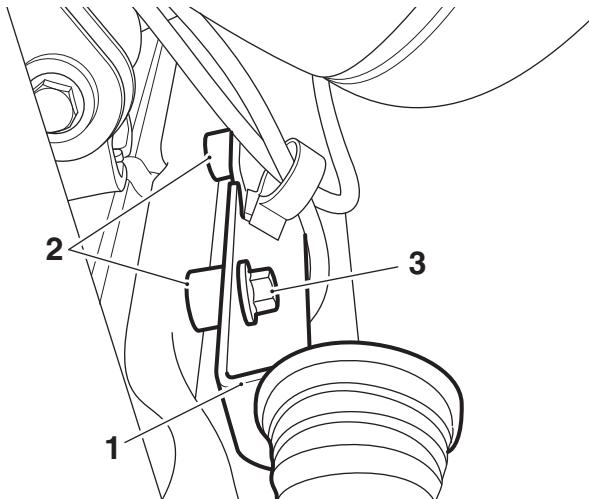
Lower Windscreen Mounting Bracket

1. Remove the windscreens (see page 16-26).
2. Release the fixings and remove the cover from the front indicator bracket. Discard the fixings.



1. Fixings
2. Cover

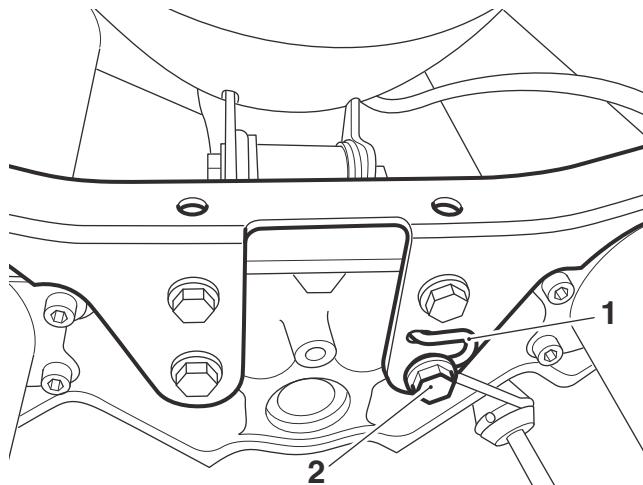
3. Release the fixings and remove the front indicator bracket assembly. Collect the fixings and spacers and carefully position the indicator bracket aside.



1. Indicator bracket
2. Spacers
3. Fixings

Note:

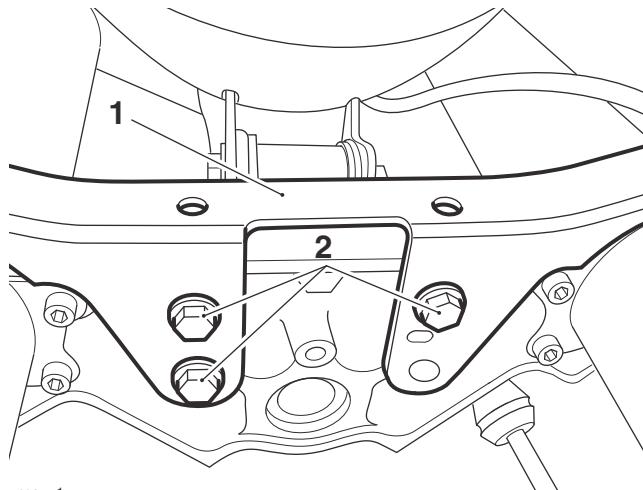
- **Note the position of the wire guide for installation.**
- 4. Release the fixing and remove the wire guide from the lower yoke.



1. Wire guide
2. Fixing

Frame & Bodywork

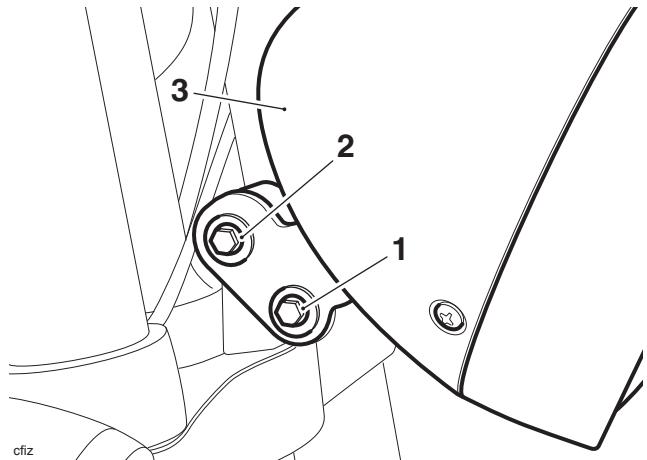
5. Release the fixings and remove the lower windscreens mounting bracket.



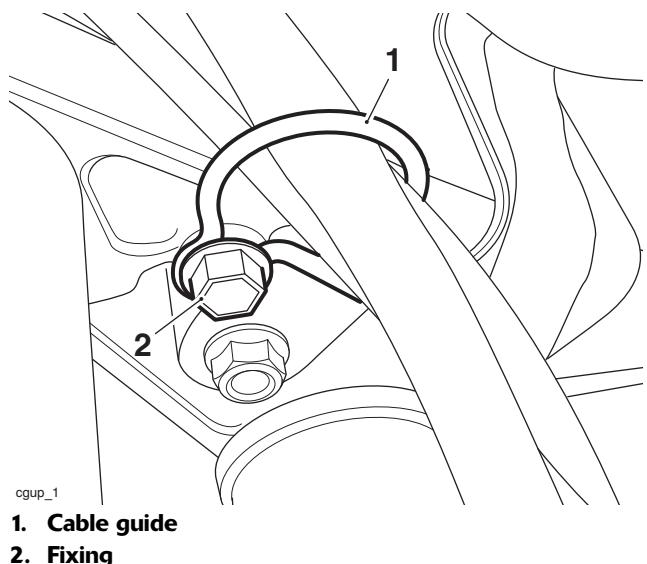
- 1. Lower windscreens mounting bracket**
2. Fixings

Upper Windscreens Mounting Bracket

1. Remove the upper fixing from the headlight mounting.
2. Loosen the lower fixing for the headlight mounting and lower the headlight.

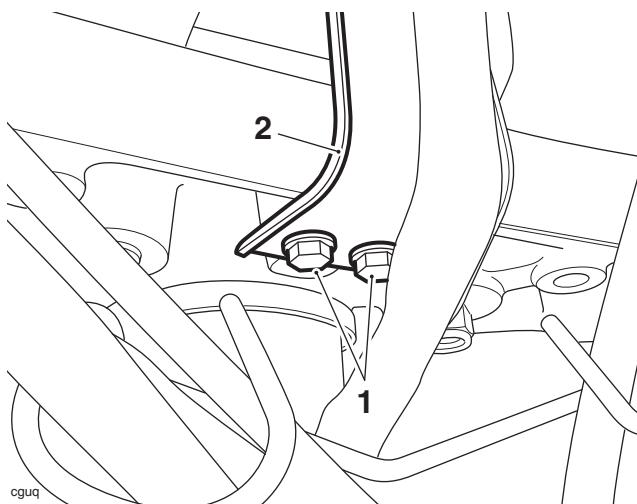


- 1. Lower fixing**
2. Upper fixing
3. Headlight
3. Release the fixings and detach the cable guide from the underside of the upper yoke.



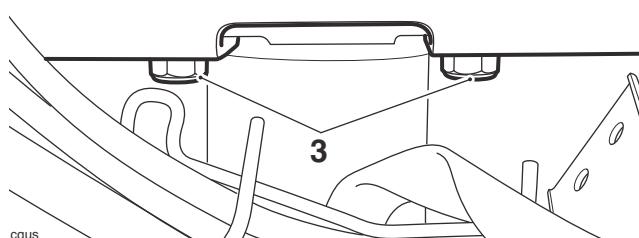
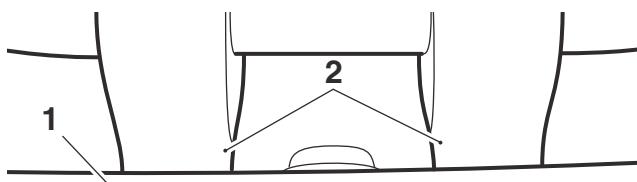
- 1. Cable guide**
2. Fixing

- Release the fixings, detach the instruments and bracket assembly from the upper yoke and carefully position aside.



- Fixings**
- Instruments bracket**

- Remove the handlebars (see page 16-19).
- Release the fixings securing the handlebar risers to the upper yoke and remove the upper windscreens mounting bracket.

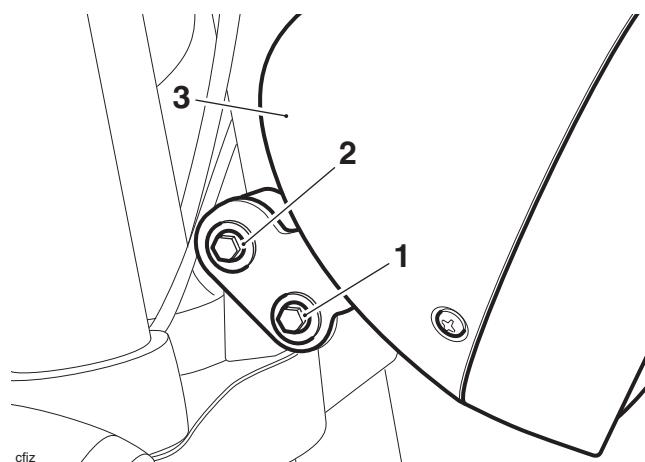


- Upper windscreens mounting bracket**
- Fixings**
- Handlebar risers**

Installation

Upper Windscreens Mounting Bracket

- Carefully align the upper windscreens mounting bracket to the upper yoke and secure using the original handlebar riser fixings. Do not fully tighten at this stage.
- Refit the instruments and bracket assembly. Tighten the fixings to **9 Nm**.
- Attach the cable guide to the underside of the upper yoke. Tighten the fixings to **20 Nm**.
- Tighten the handlebar riser fixings to **38 Nm**.
- Refit the handlebar (see page 16-21).
- Raise the headlight and fit the upper fixing. Do not fully tighten at this stage.

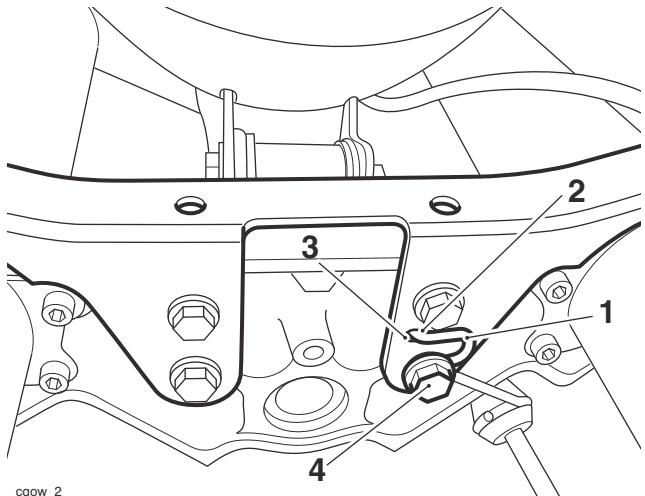


- Lower fixing**
- Upper fixing**
- Headlight**
- Check and adjust the headlight vertical alignment. When set to the correct position, tighten the headlight vertical alignment fixings to **12 Nm**.

Frame & Bodywork

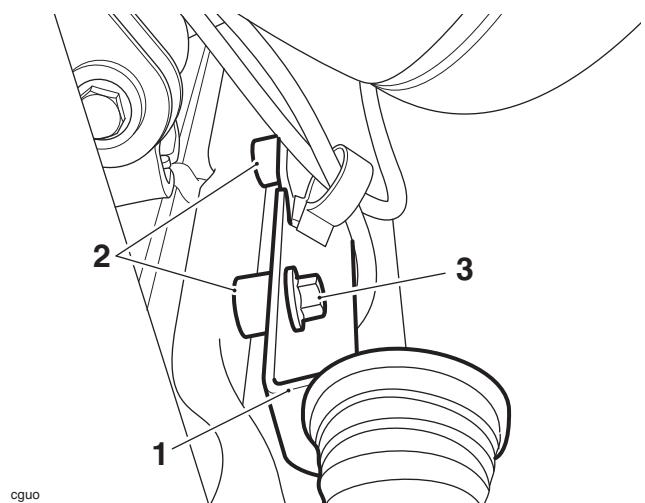
Lower Windscreen Mounting Bracket

1. Carefully align the lower windscreen mounting bracket to the lower yoke and secure using the original fixings. Do not fully tighten at this stage.
2. Fit the wire guide as noted for removal, ensure its locating tang aligns with the front hole. Fit the original fixing through the rear hole. Do not fully tighten at this stage.



1. **Wire guide**
2. **Locating tang**
3. **Front hole**
4. **Fixing**

3. Refit the indicator bracket assembly using the original fixings and spacers as shown below. Tighten the fixings to **10 Nm**.



1. **Indicator bracket**
2. **Spacers**
3. **Fixings**

4. Tighten the lower windscreen mounting bracket fixings to **20 Nm**.
5. Tighten the wire guide fixing to **20 Nm**.
6. Using new fixings, refit the cover to the front indicator bracket. Tighten the fixings to **5 Nm**.
7. Fit the windscreen (see page 16-26).
8. Check the routing of the wiring harnesses and ensure that they are not trapped or stressed in any way.

Warning

Move the handlebars to left and right full lock while checking that the cables or harnesses do not bind or restrict full lock operation. Any component, cables or harnesses that will restrict the steering may cause loss of motorcycle control and an accident.

Footboard Assemblies - America and America LT from VIN 611105 (except VIN 611134)

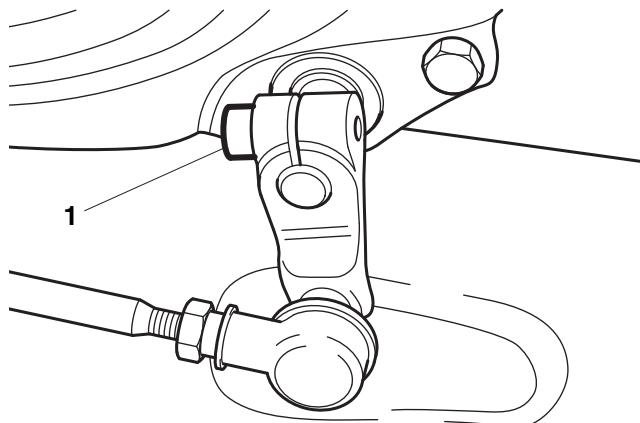
Warning

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.

Removal

Left Hand Footboard

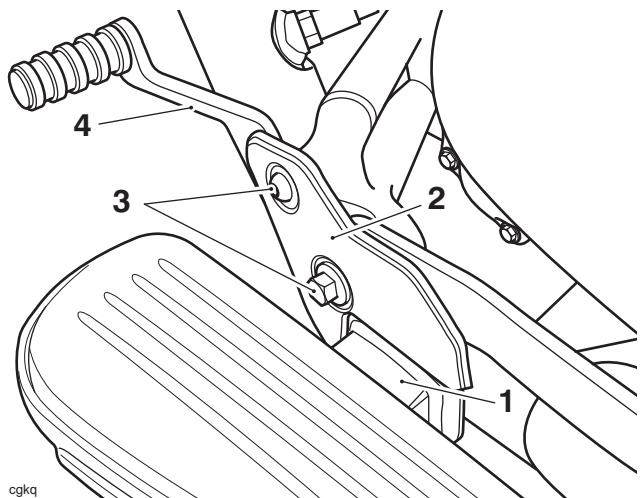
1. Note the position of the gear change lever on its shaft then release the clamp bolt and remove the lever.



T908.03.06

1. Clamp bolt

2. Release the two fixings and remove the footboard and mounting plate assembly, its cover and the gear change lever assembly.



1. Footboard mounting plate

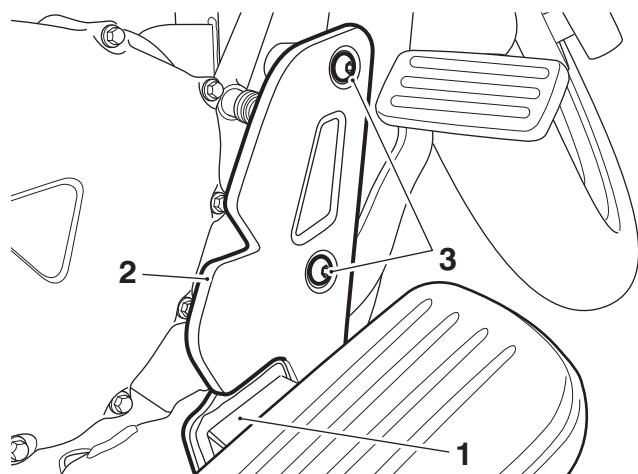
2. Cover

3. Fixings

4. Gear change lever assembly

Right Hand Footboard

1. Release to two fixings and remove the footboard and mounting plate assembly and its cover.



1. Footboard mounting plate

2. Cover

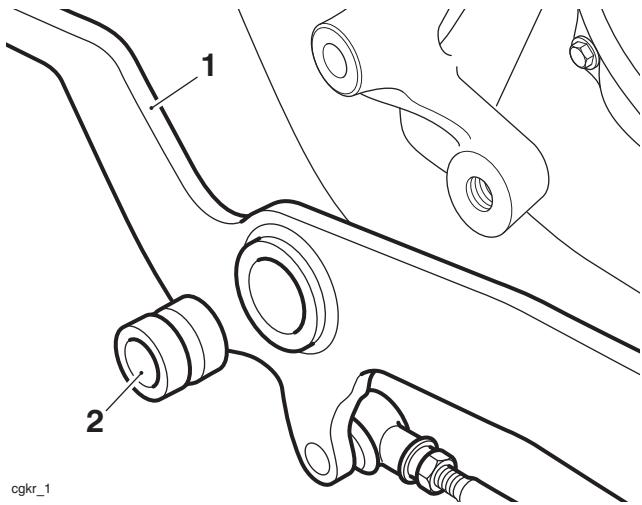
3. Fixings

Frame & Bodywork

Installation

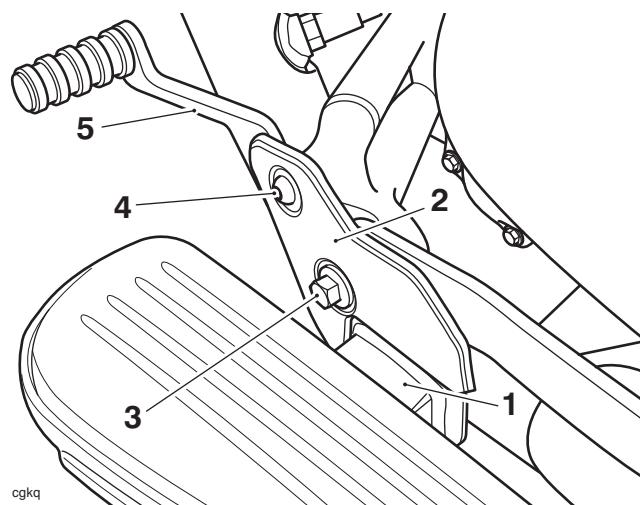
Left Hand Footboard

1. Lubricate the gear change lever boss with grease to NLGI 2 specification.



1. Gear change lever
2. Boss

2. Align the left hand footboard and mounting plate assembly, its cover and the gear change lever assembly to the motorcycle. Secure using the original fixings.
3. Tighten the M8 Fixing to **15 Nm** and the M10 fixing to **40 Nm**.

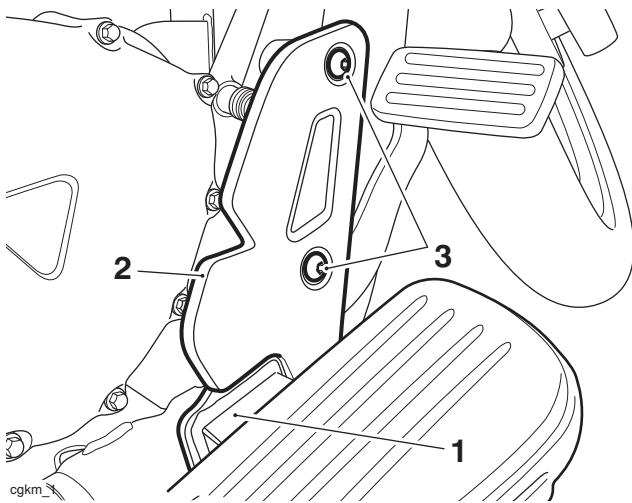


1. Footboard mounting plate
2. Cover
3. M10 fixing
4. M8 fixing
5. Gear change lever assembly

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

Right Hand Footboard

1. Align the right hand footboard and mounting plate assembly and its cover to the motorcycle. Secure using the original fixings and tighten to **15 Nm**.



1. Footboard mounting plate
2. Cover
3. Fixings

17 Electrical & Ignition Systems

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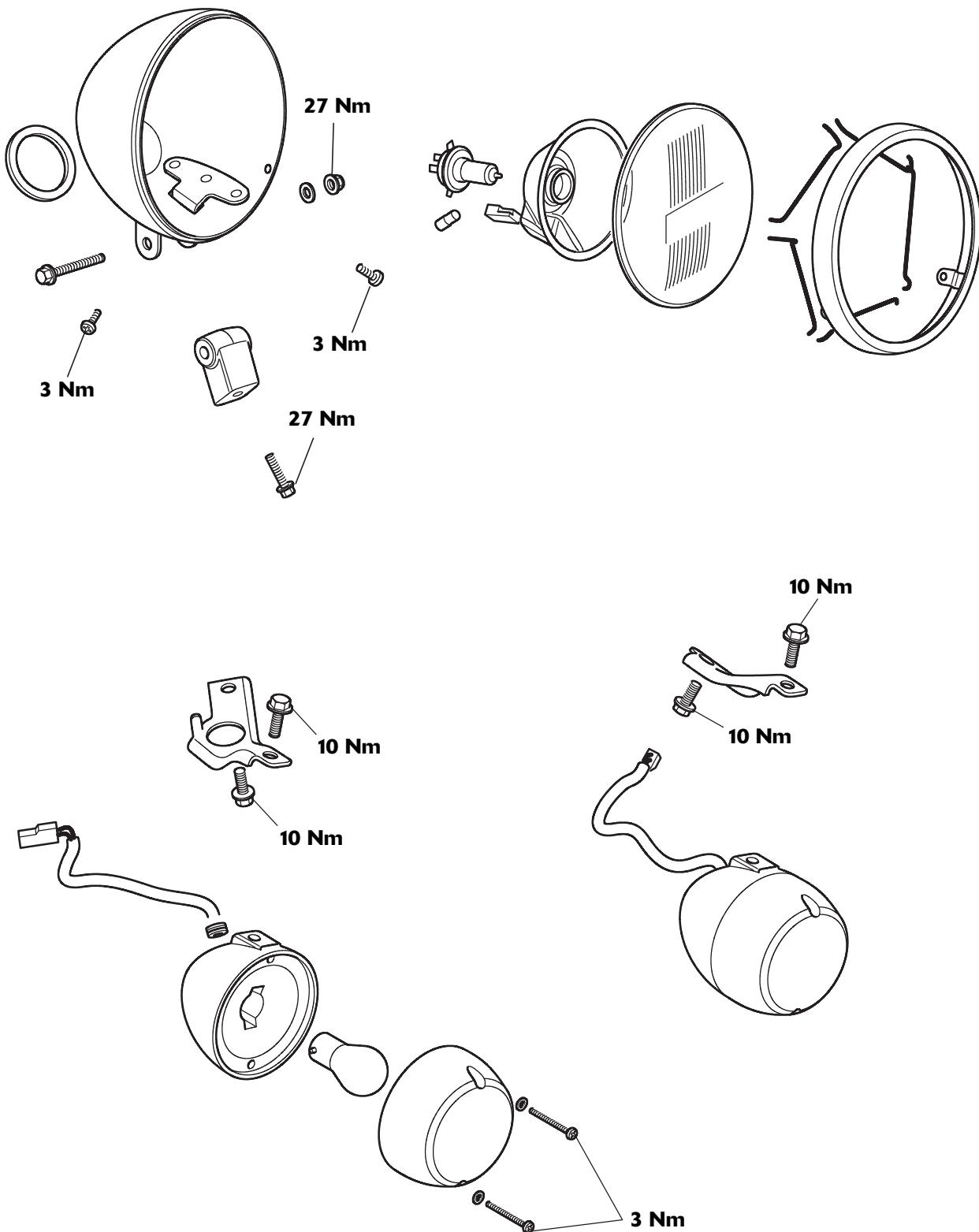
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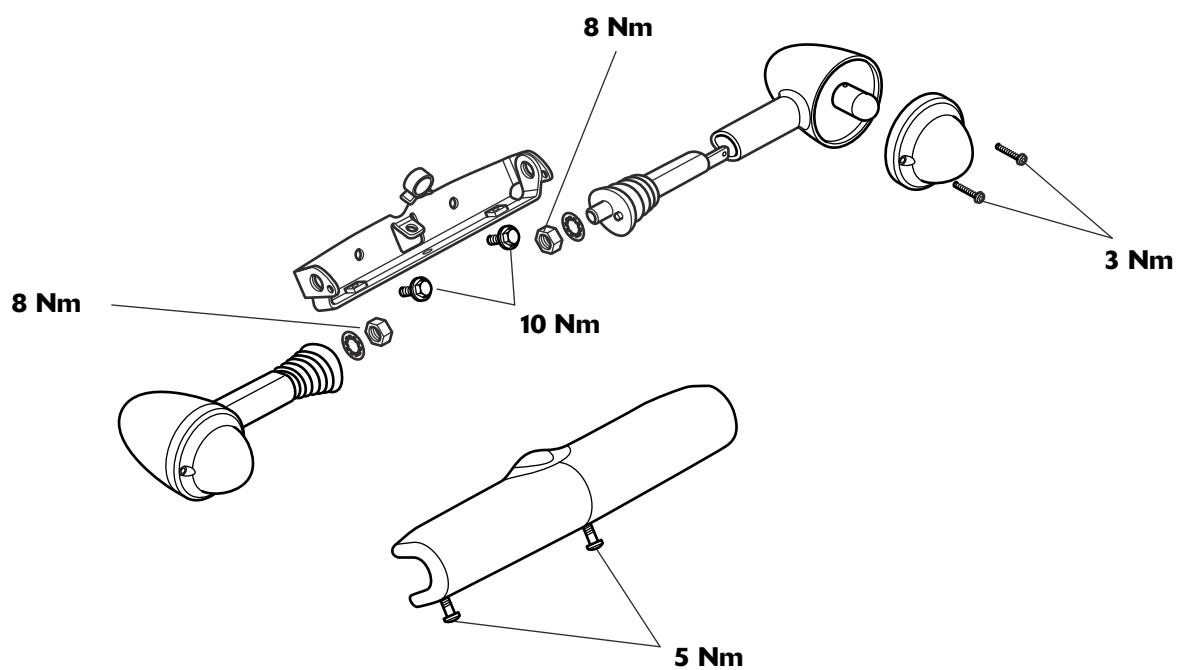
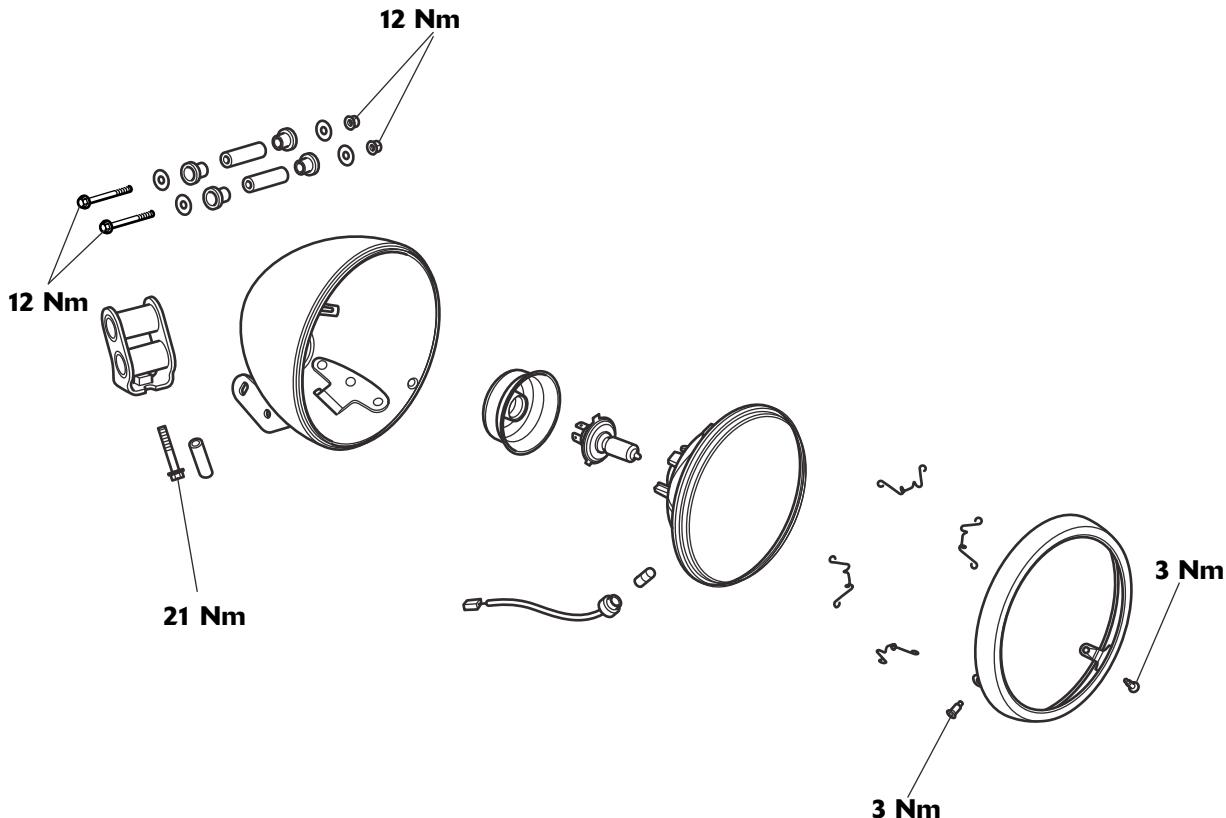
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Exploded View - Headlight and Front Indicators - America up to VIN 468389 & Speedmaster up to VIN 469049

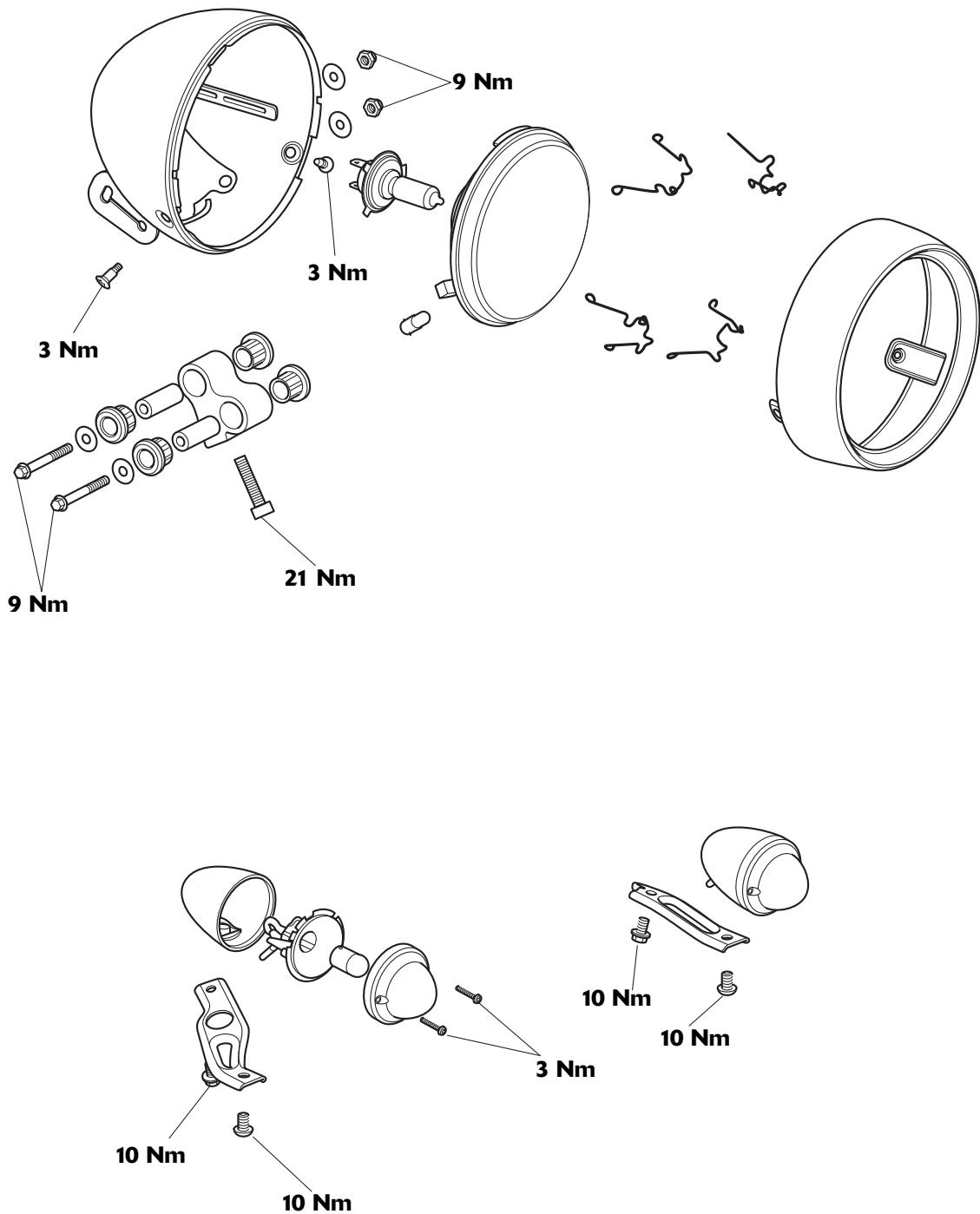


Electrical & Ignition Systems

Exploded View - Headlight and Front Indicators - America and America LT from VIN 468390

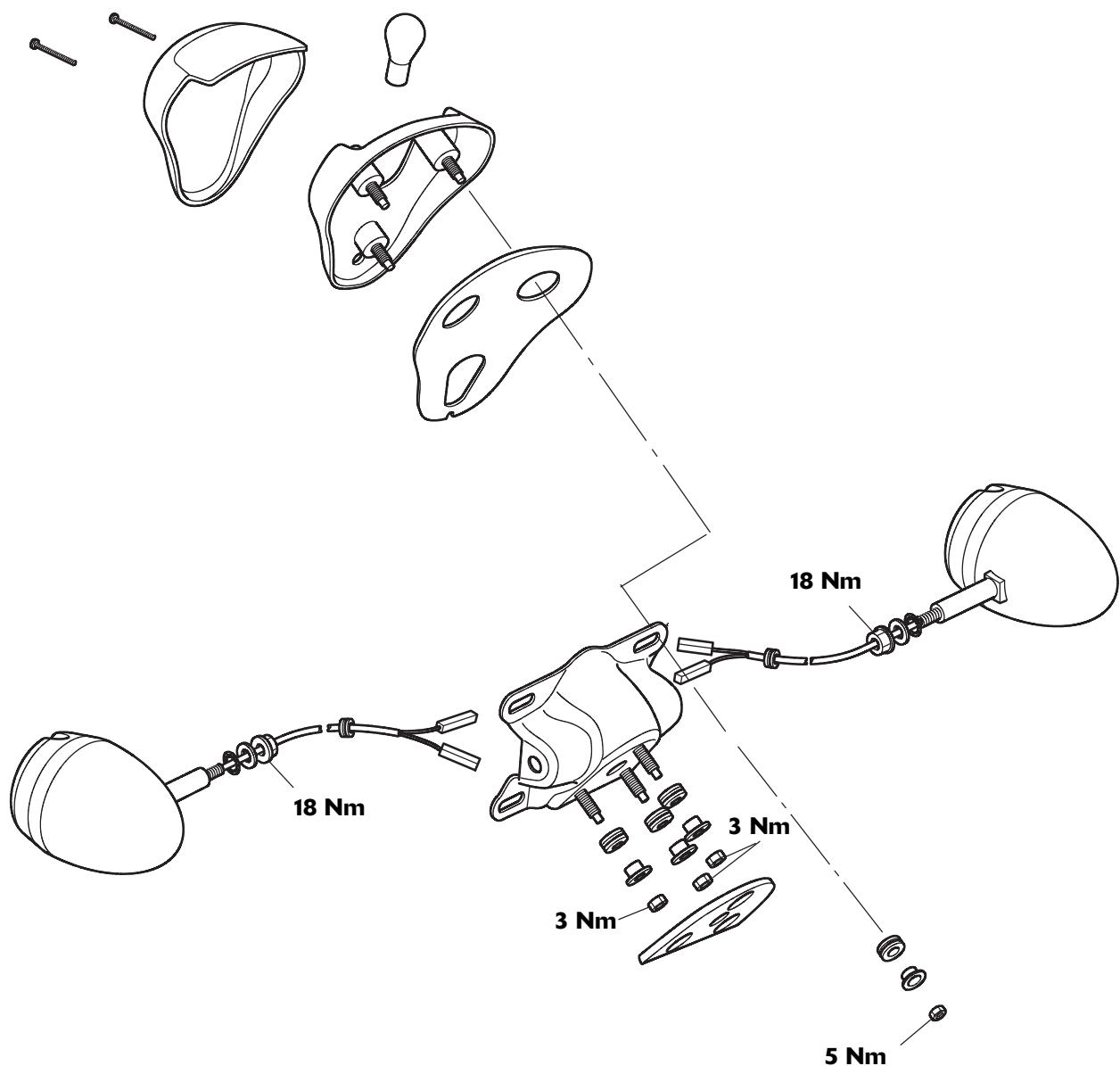


Exploded View - Headlight and Front Indicators - Speedmaster from VIN 469050

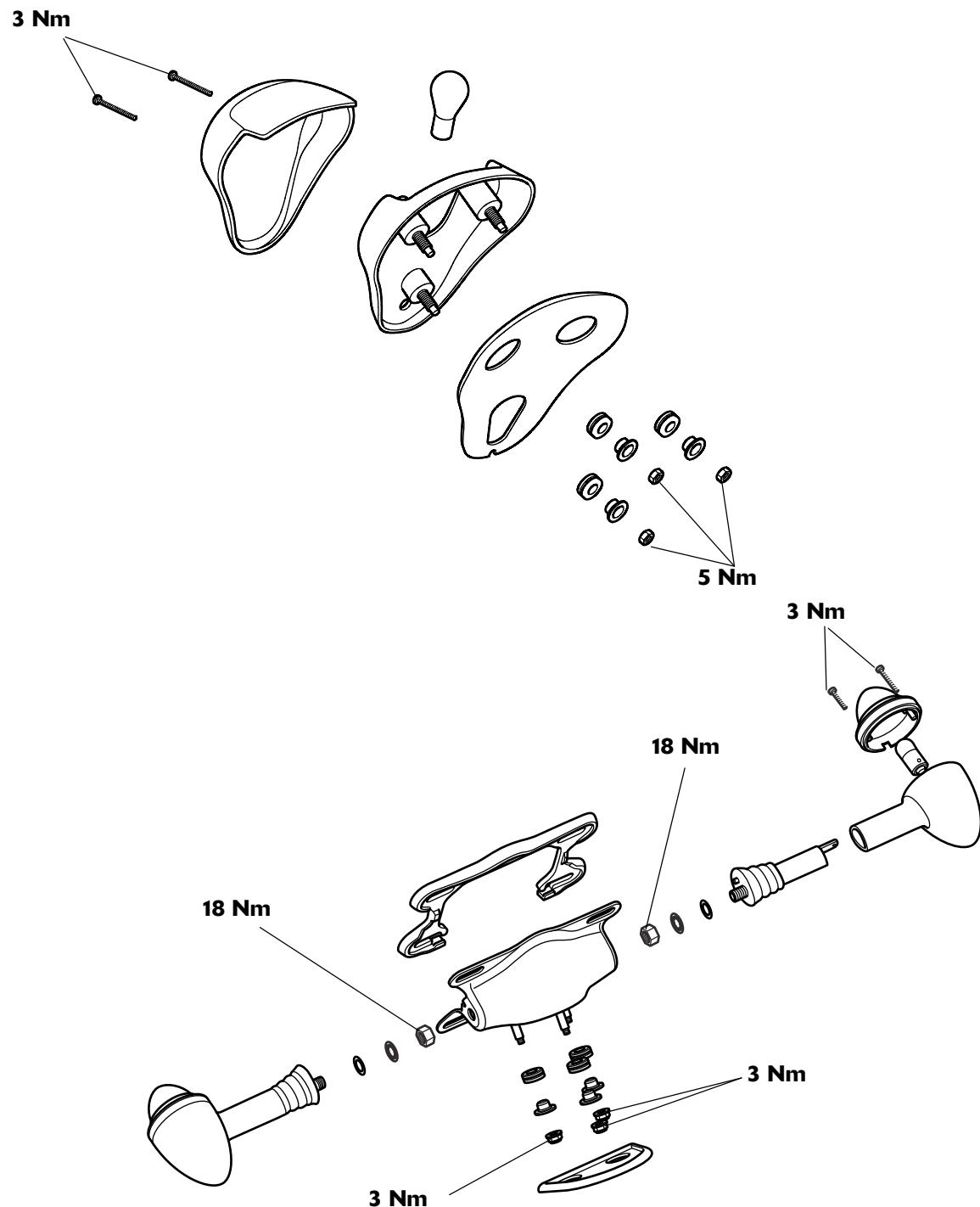


Electrical & Ignition Systems

Exploded View - Rear Light and Rear Indicators - America up to VIN 468389 & Speedmaster up to VIN 469049

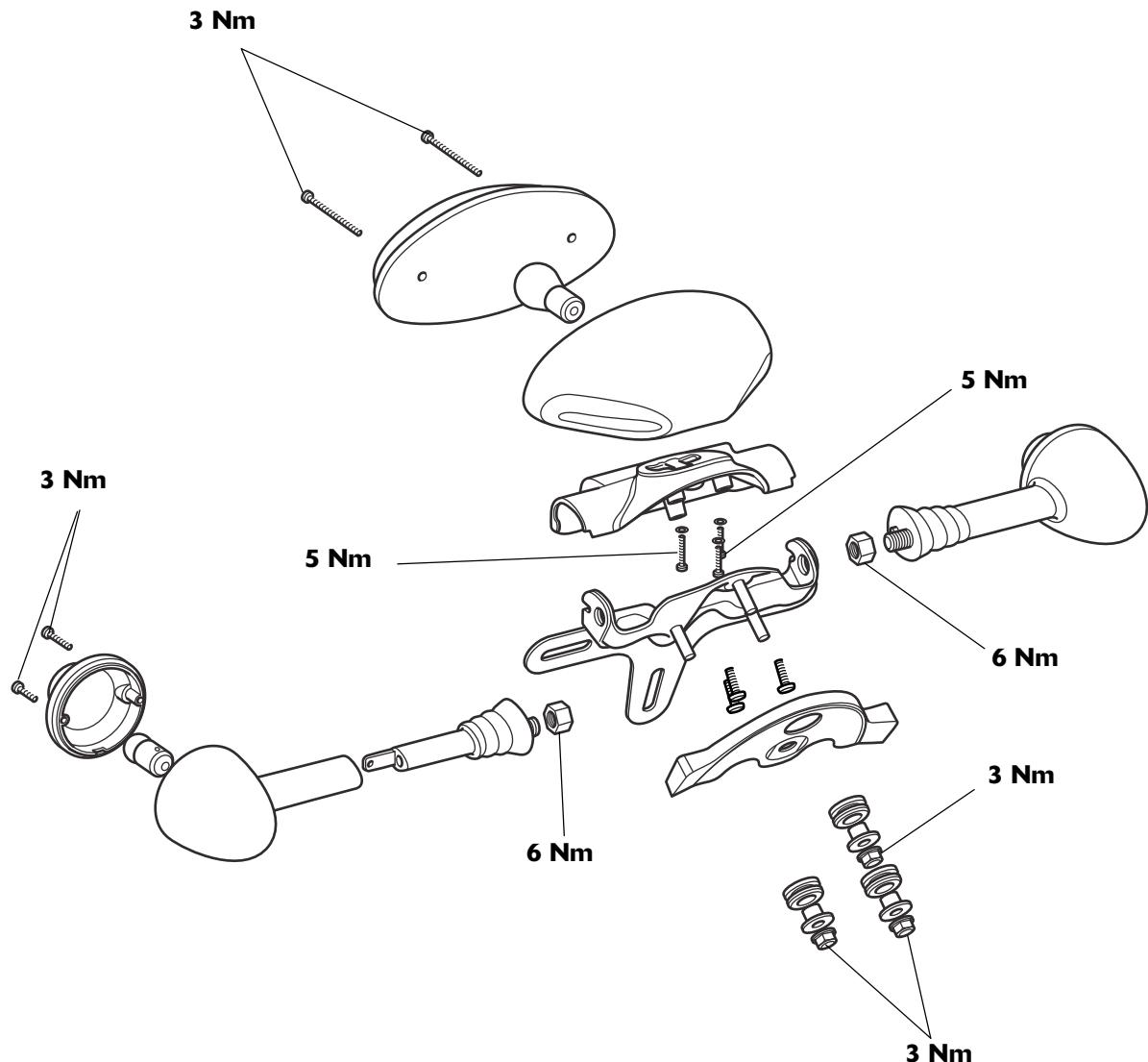


Exploded View - Rear Light and Rear Indicators - America and America LT from VIN 468390

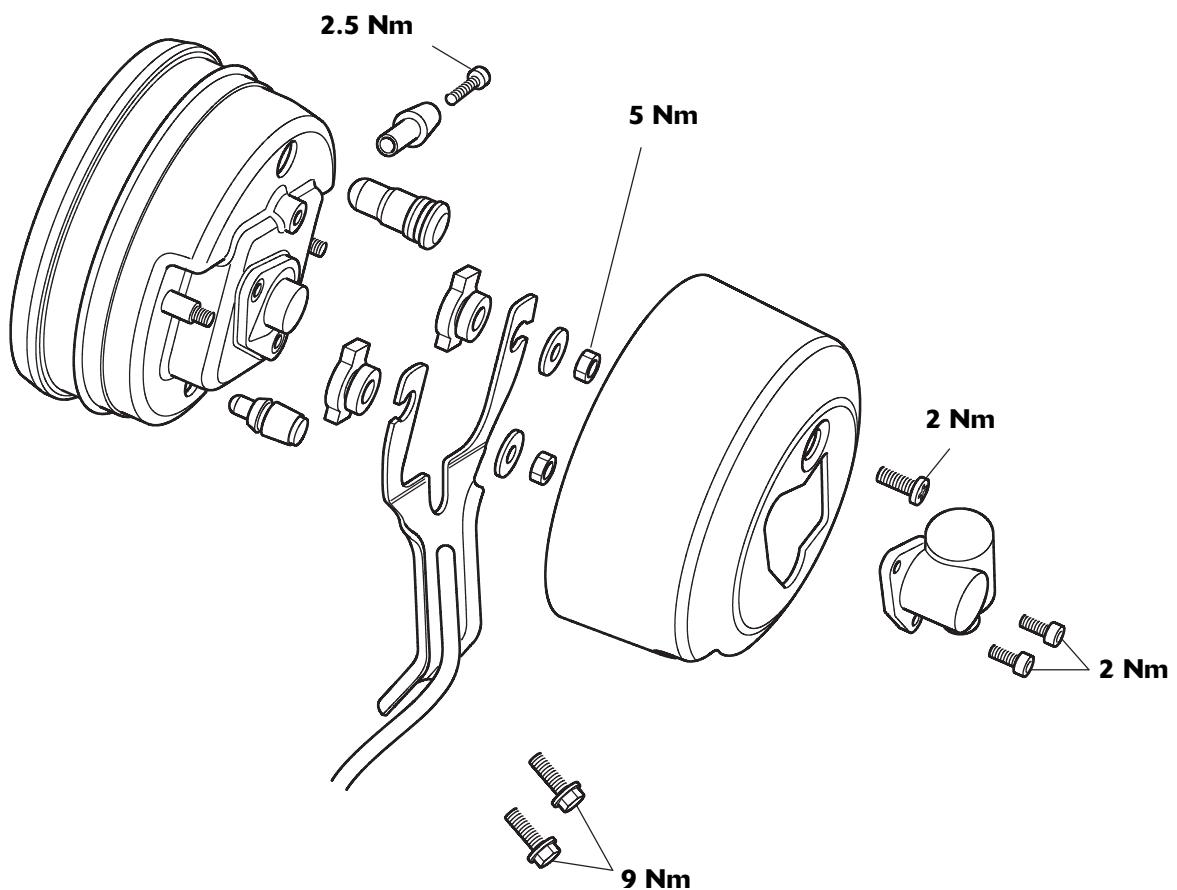


Electrical & Ignition Systems

Exploded View - Rear Light and Rear Indicators - Speedmaster from VIN 469050

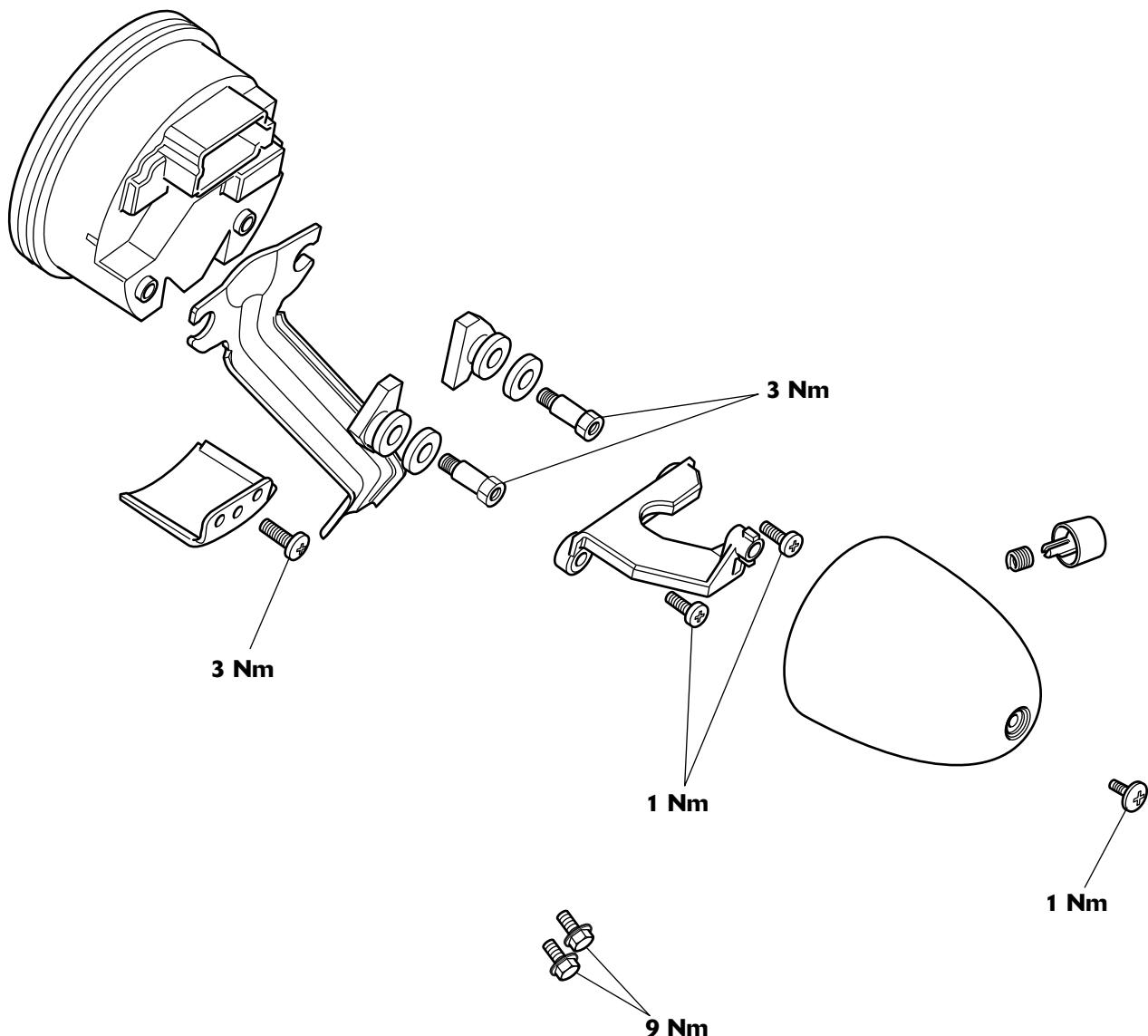


Exploded View - Speedometer Assembly - America & Speedmaster - Models with Cable Driven Speedometer

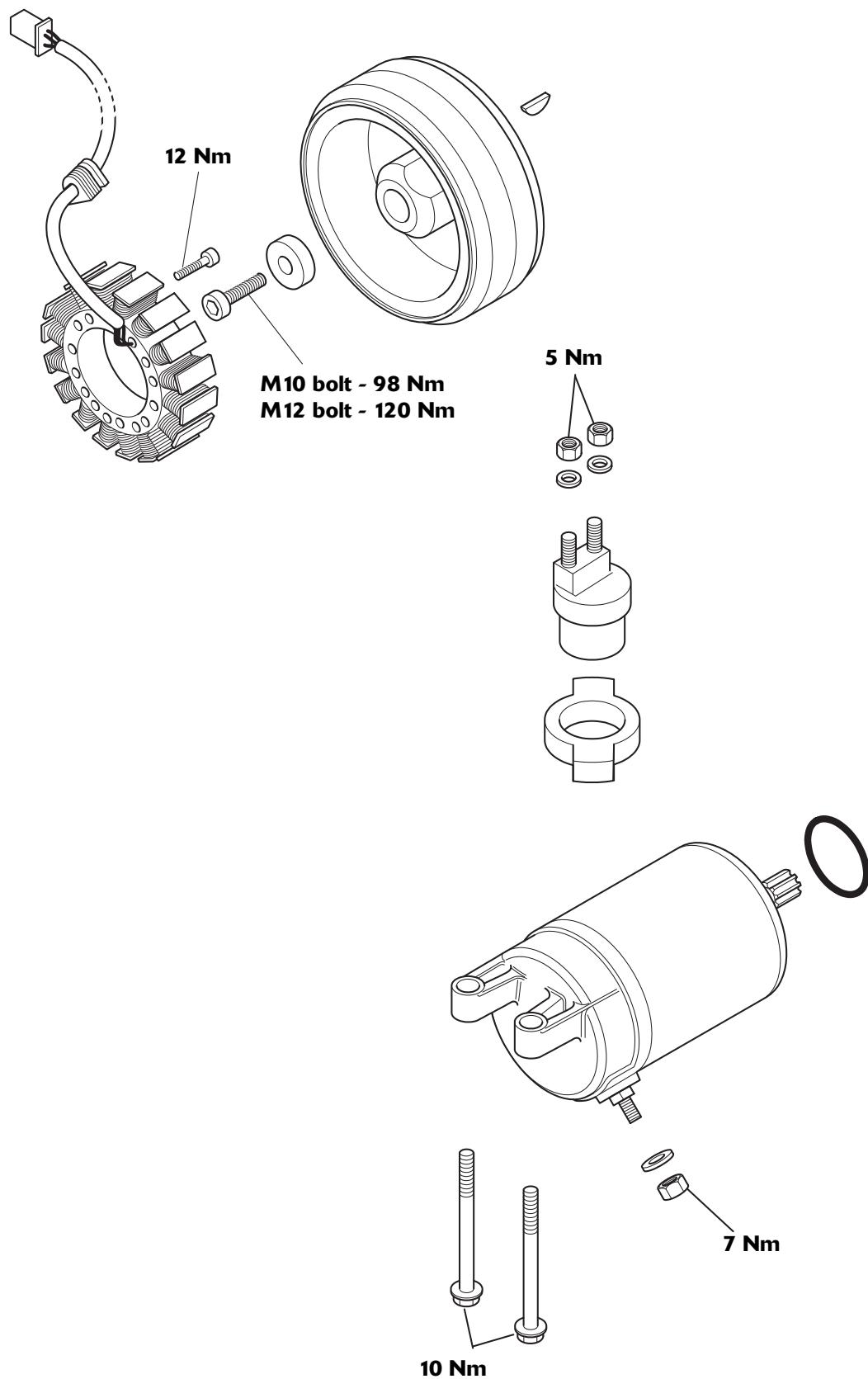


Electrical & Ignition Systems

Exploded View - Speedometer Assembly - America, America LT & Speedmaster - Models with Electronic Speedometer

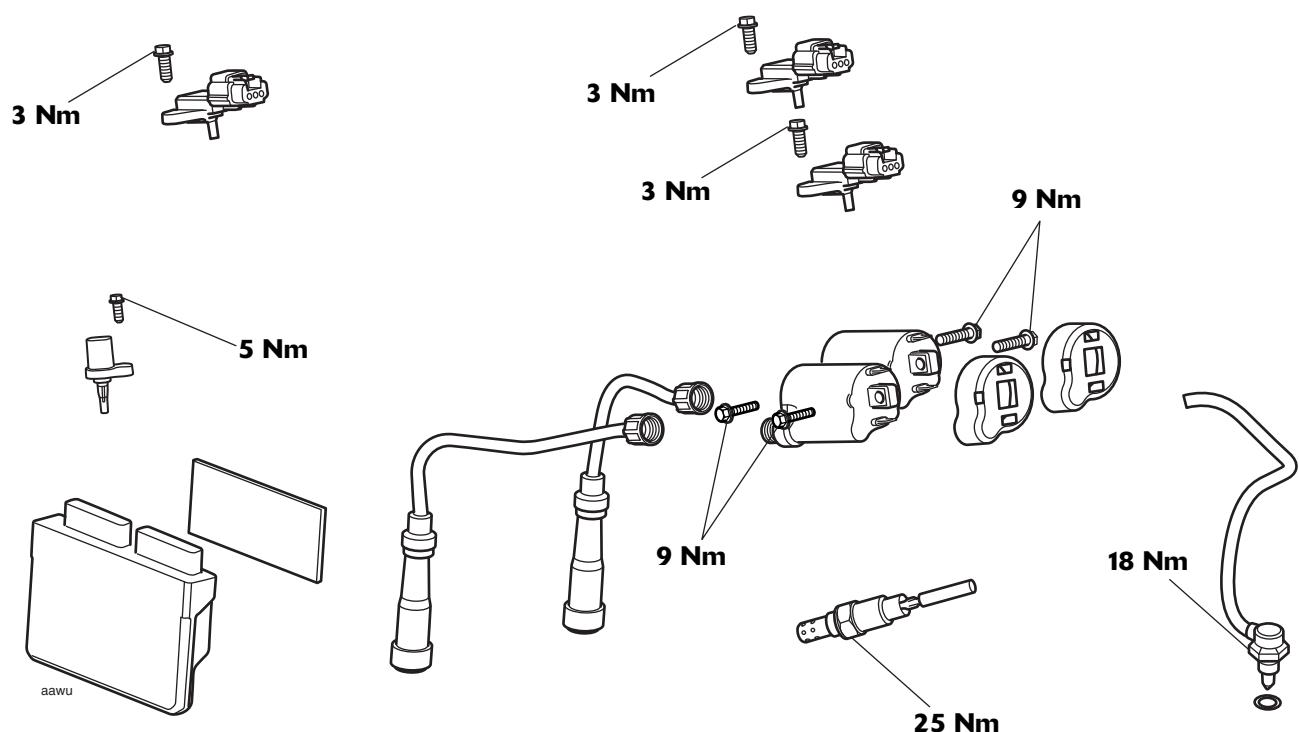


Exploded View - Alternator and Starter Motor- All Models



Electrical & Ignition Systems

Exploded View - ECU - America, America LT & Speedmaster - Fuel Injected 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.

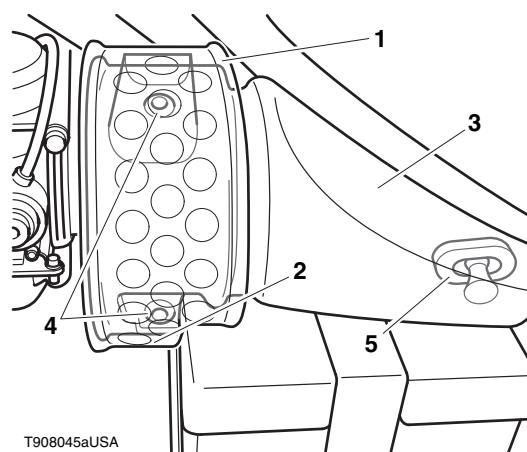
Battery

Note:

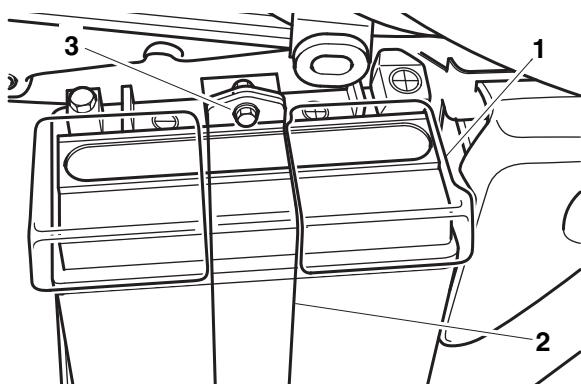
- Read through the safety precautions before proceeding.

Removal

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

Electrical & Ignition Systems

7. Tilt the battery outwards from the top to remove it from the battery tray.

Note:

- **For America up to VIN 468389 and Speedmaster up to VIN 469049 only: Models with Electronic Fuel Injection (EFI), the Engine Control Module (ECM) is located at the rear of the battery tray and is secured to the motorcycle by the battery. Ensure the ECM is not disturbed during the battery removal or installation process.**



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

1. **For America up to VIN 468389 and Speedmaster up to VIN 469049 only:** Models with Electronic Fuel Injection (EFI) only, ensure the Engine Control Module (ECM) and its rubber cover are correctly located behind the battery.
2. Place the battery onto the battery tray taking care not to touch the terminals to the motorcycle.
3. Reconnect the battery leads, positive (red) lead first.
4. Apply a light coat of petroleum jelly to the terminals to prevent corrosion.
5. Cover the positive terminal with the protective cap.
6. Fit the battery cover and assemble the battery strap. Tighten the battery strap fixing to **9 Nm**.
7. Assemble the airbox cover and finisher, tightening all fixings to **3 Nm**. Ensure the airbox cover stud is correctly located.

Battery Commissioning and Charging

Note:

- **Read through the safety precautions before proceeding.**

New Battery

In order to correctly and safely commission a new battery, the battery commissioning procedure listed below must be carefully followed. This is the only battery commissioning procedure that Triumph recommends. The procedure is designed to ensure that the battery is at its best when fitted to the motorcycle, and will provide the best possible performance and reliability.

Failure to comply with this procedure may lead to reduced battery performance and/or shorten the life of the battery.



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.

The battery contains sulphuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.

- If electrolyte gets on your skin, flush with water immediately.
- If electrolyte gets in your eyes, flush with water for at least 15 minutes and **SEEK MEDICAL ATTENTION IMMEDIATELY**.
- If electrolyte is swallowed, drink large quantities of water and **SEEK MEDICAL ATTENTION IMMEDIATELY**.

KEEP ELECTROLYTE OUT OF THE REACH OF CHILDREN.

1. Ensure the VIN number printed on the anti-tamper label attached to the battery matches the motorcycle VIN.
2. Read the instructions and warnings delivered with the battery.
3. Place the battery on a flat level surface and remove the sealing foil.



Caution

Ensure the electrolyte container part number matches the battery part number to be filled. Battery life will be greatly reduced if the incorrect volume (either too little or too much) of acid is added to the battery.

4. 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.
5. Place the electrolyte container and adapter (if applicable) on the battery and fill the battery according to the manufacturers instructions.
6. After starting to fill the battery with electrolyte, allow the battery to stand for 30 minutes with the filling container in place.
7. 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.
8. After the electrolyte has drained into the battery, allow the battery to stand with the electrolyte container in place for a further 30 minutes for batteries 3Ah - 12Ah or 1 hour for batteries greater than 12Ah.
9. Remove the electrolyte container and adapter carefully, and dispose of immediately.
10. Place the sealing cap strip LOOSELY over the filling holes of the battery.
11. Charge the battery using the BatteryMate 150-9. Refer to the instructions supplied with the BatteryMate 150-9.



Caution

The caps must be fitted (after charging) within two hours of filling the battery with acid. Leaving the battery open to the atmosphere for longer than is necessary will start to reverse the chemical reaction which takes place within the battery, greatly reducing the battery's service life.

12. After charging is complete, press down firmly with both hands to seat the caps (do not use tools or force the caps into position).
13. Disconnect the charger and allow the battery to stand for 1 hour before fitting to the motorcycle.
14. Fit the battery to the motorcycle, positive (red) lead first.

Battery Maintenance

The battery is a sealed type and does not require any maintenance other than checking the voltage and routine recharging such as during storage.

It is not possible to adjust the electrolyte level in the battery.

Note:

- **The charge level in the battery must be maintained to maximise the battery life.**

With normal use of the motorcycle, the charging system will keep the battery charged. If the motorcycle is unused, the battery will gradually discharge due to battery self discharge and the continuous current drain for the clock and the engine control module memory.

The rate of battery discharge can be greatly increased by the addition of electrical security systems or other accessories.

Allowing a battery to discharge, or leaving it discharged over a period of time, causes sulphation of the lead plates within the battery.

Sulphation is a normal chemical reaction inside the battery and over a period of time sulphate will crystallise on to the lead plates making charging difficult or impossible. The result is a permanently damaged battery, which would not be covered by the motorcycle warranty.

Keeping a battery at full charge reduces the chance of it freezing in cold conditions. Allowing a battery to freeze can cause serious internal damage to the battery.

When leaving the motorcycle standing for more than a few days, regularly check the battery voltage using a digital multimeter. Should the battery voltage fall below 12.8 V, charge the battery using the BatteryMate 150-9. Refer to the instructions supplied with the BatteryMate 150-9.

For extended periods of storage (beyond two weeks) the battery should be removed and the battery voltage checked regularly and charged when below 12.8 V.

Electrical & Ignition Systems

Battery Already in Service

Note:

- Before carrying out the following procedure the battery must be disconnected and removed from the motorcycle.

Use the guidelines in the table on the following page for charging. Always verify the battery condition before charging, and 30 minutes after charging.

Note:

- A fully charged battery should read 12.8 Volts or higher after the battery has been off the charger for 30 minutes or more.

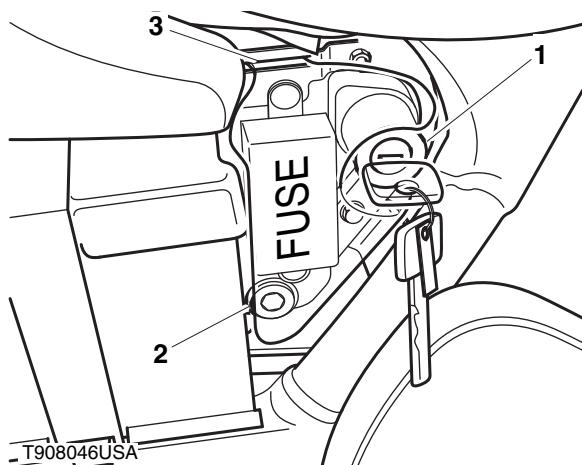
Table of Battery Charging Times

State of charge	Voltage	Action	Charge time (using BatteryMate 150-9)
100%	12.8 V - 13.0 V	None. Check at 6 months from date of manufacture	None required
75% - 100%	12.5 V - 12.8 V	May need slight charge. If no charge given, check in 3 - 4 months	3 - 6 hours
50% - 75%	12.0 V - 12.5 V	Needs charge	5 - 11 hours
25% - 50%	11.5 V - 12.0 V	Needs charge	At least 13 hours
0% - 25%	11.5 V or less	Needs recovery using BatteryMate 150-9. Re-test after recovery	20 hours

Fuses and Relays

Fuse Location

The fuse box is located beneath the ignition switch cover. To remove the ignition switch cover and access the America, America LT 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

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 - Carburetors Models

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 - All Electronic Fuel injection (EFI) Models with Cable Driven Speedometer

Fuse No	Circuits Protected	Fuse Rating (Amp.)
1	Accessory Lights	10
2	Alarm, Clock	10
3	Accessory Socket, Diagnostic Connector	10
4	Ignition Switch Main Feed	10
5	Engine Management System	20
6	Not Used	-
7	Indicators, Brake Light, Horn	10
8	Position Light, Instrumentation Illumination	5
9	Dip/Main Beam	10
10	Position Lights	5
11	Main Battery Fuse	30

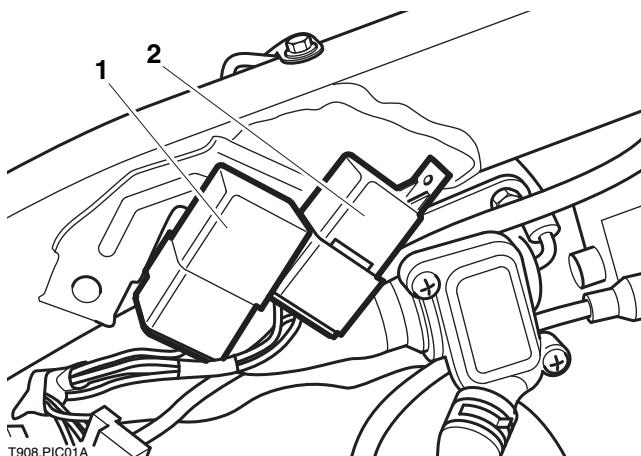
Electrical & Ignition Systems

Fuse Identification - All Electronic Fuel injection (EFI) Models with Electronic Speedometer

Fuse No	Circuits Protected	Fuse Rating (Amp.)
1	Accessory Lights	10
2	Alarm, GPS	10
3	Accessory Socket, Diagnostic Connector	10
4	Ignition Switch Main Feed, Instrumentation Illumination	10
5	Engine Management System	20
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 Battery Fuse	30

Relays - carburettor models

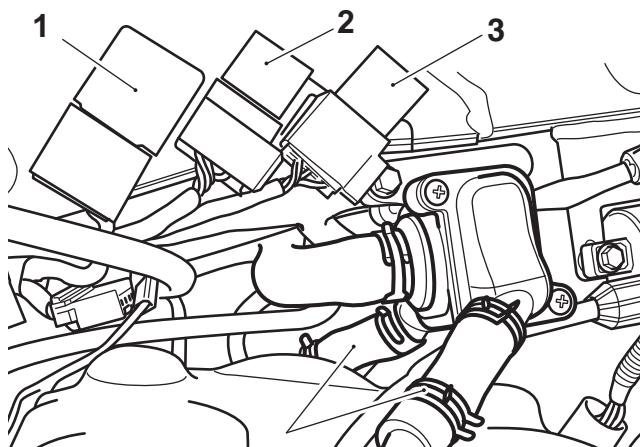
The headlight and indicator relays are located beneath the fuel tank on the right hand side of the frame spine tube.



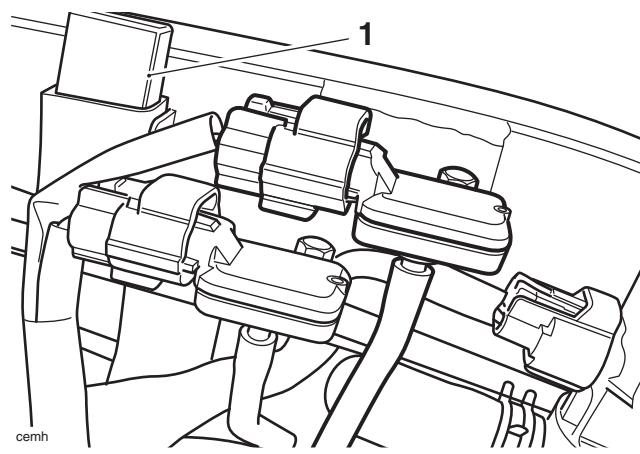
- 1. Indicator relay
- 2. Headlight relay

Relays - EFI models

On fuel injected models the relays are located beneath the fuel tank on both sides of the frame spine tube.



- 1. Indicator relay
- 2. Fuel pump relay
- 3. Engine management system (EMS) relay



- 1. 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.



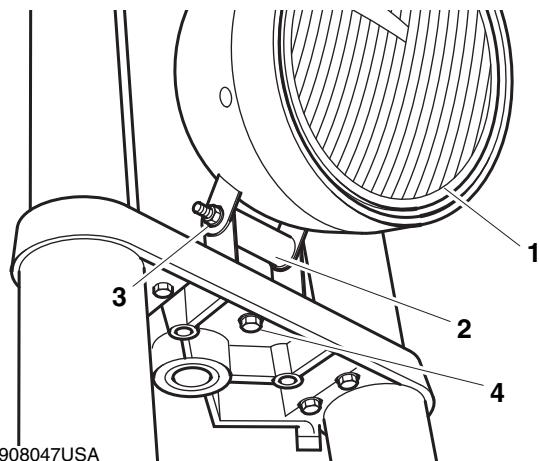
Warning

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.

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 (located on the underside of the lower yoke) and turn the headlight assembly left or right. When set to the correct position, tighten the bracket fixing to:
 - **27 Nm** for America up to VIN 468389 and Speedmaster up to VIN 469049.
 - **21 Nm** for America and America LT from VIN 468390 and Speedmaster from VIN 469050.

3. Vertical adjustment of the headlight is controlled by the position of the headlight shell in relation to the bracket on which it is mounted. To adjust the vertical setting, slacken the headlight shell pinch-bolt(s) and move the headlight assembly up or down. When set to the correct position, tighten the bracket pinch-bolt(s) to:

- **27 Nm** for America up to VIN 468389 and Speedmaster up to VIN 469049.
- **12 Nm** for America and America LT from VIN 468390.
- **9 Nm** for Speedmaster from VIN 469050.



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.

Electrical & Ignition Systems

Headlight Bulb Replacement

Note:

- **Read through the safety precautions before proceeding.**

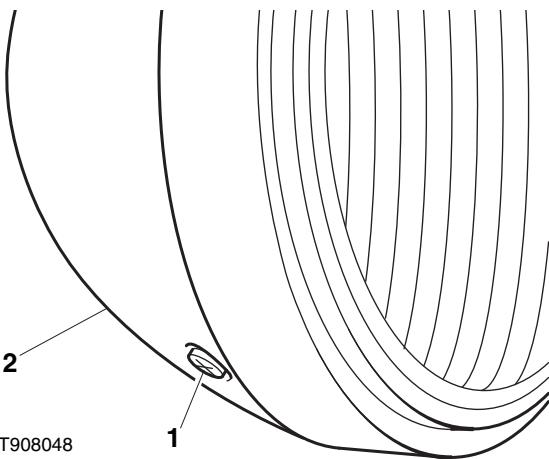


Warning

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.



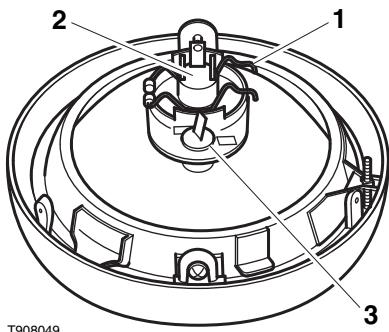
1. **Headlight rim screw**
2. **Headlight shell**
2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight rim.
3. Free the rubber cover from the rear of the reflector.



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**

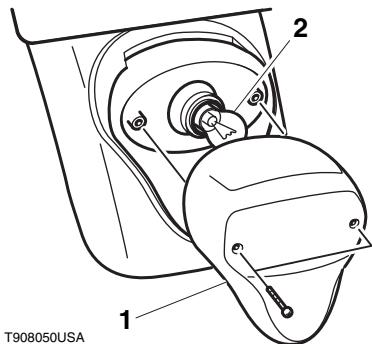
2. **Headlight bulb**

3. **Sidelight bulb holder**

4. To renew the sidelight bulb, release the retaining clip and remove the sidelight bulb holder. 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. Refit the headlight to the headlight shell and tighten the fixings to **3 Nm**.
9. Check the headlight beam alignment.

Rear Light Bulb Replacement

1. Undo the screws and remove the lens from the light unit.



T908050USA

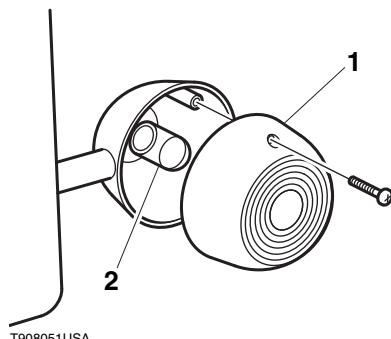
1. Lens screw

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

1. Undo the screws and remove the lens from the light unit.



T908051USA

1. Lens screw

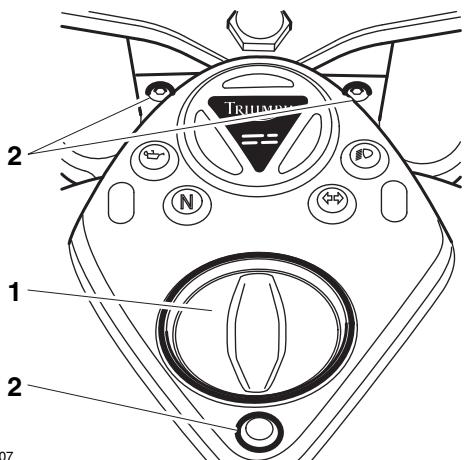
2. Bulb

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.

Electrical & Ignition Systems

Warning Light Bulb Replacement

- Release the screws securing the warning light console to the fuel tank.

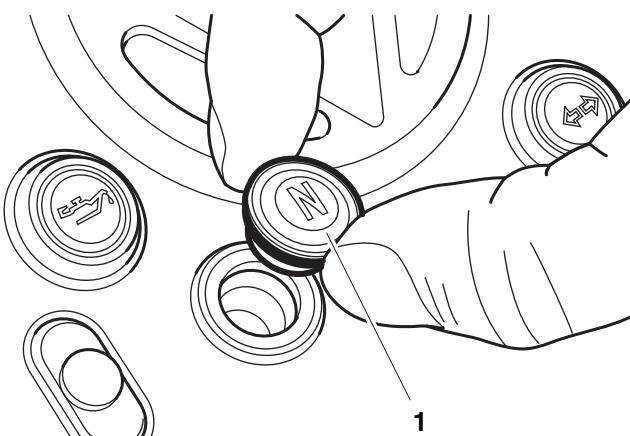


T908.PIC07

1. Console

2. Screws

- Raise the console and disconnect the multi-plug connector joining the warning light harness to the main harness.
- Carefully prise the warning light lens (of the light to be rectified/checked) from the upper side of the console.

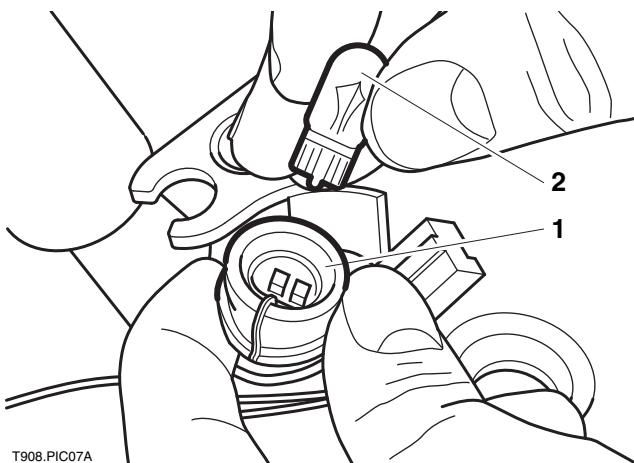


T908.PIC06A

1. Warning light cover

- Remove the bulb holder from the rear of the console.

- Peel back the rubber cover surrounding the bulb and then remove the bulb from the holder.



T908.PIC07A

1. Rubber cover

2. Bulb

Note:

- The bulbs do NOT have bayonet retainers.
- Fit the replacement bulb.
 - Return the rubber cover to its normal condition.
 - Refit the bulb holder to the console.
 - Refit the warning light lens, ensuring the bulb holder is not dislodged as the lens is inserted. If necessary, rotate the lens until it is aligned with the remaining lenses.
 - Position the console to the fuel tank and reconnect the wiring multi-plug connector.
 - Fit the console and tighten its screws to **3 Nm**.
 - Check for correct operation of the lights.

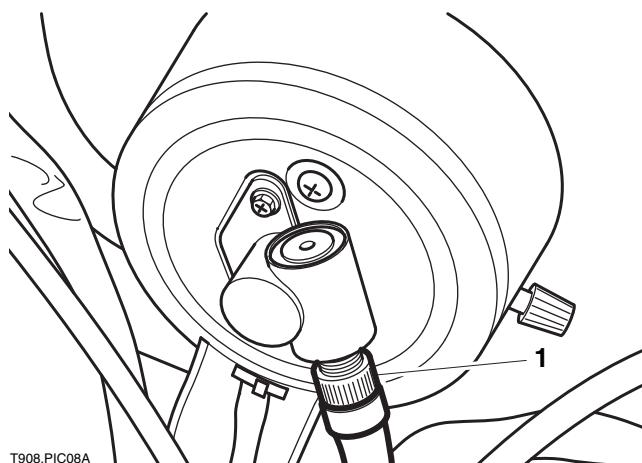
Speedometer Light Bulb Replacement - only Models with Cable Driven Speedometer

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.

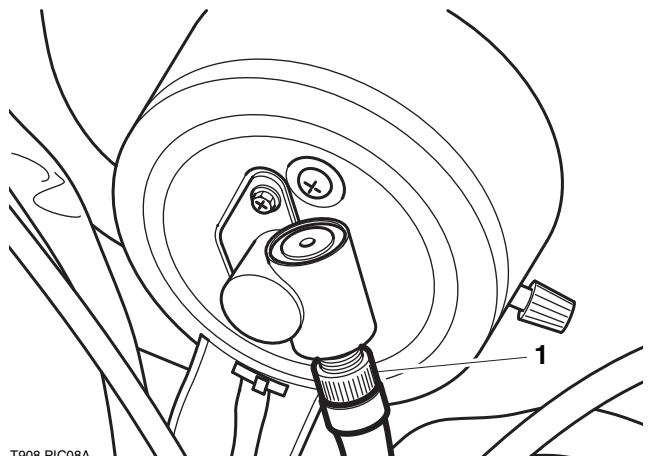


1. Speedometer cable retaining ring

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 bulb holders from the speedometer.

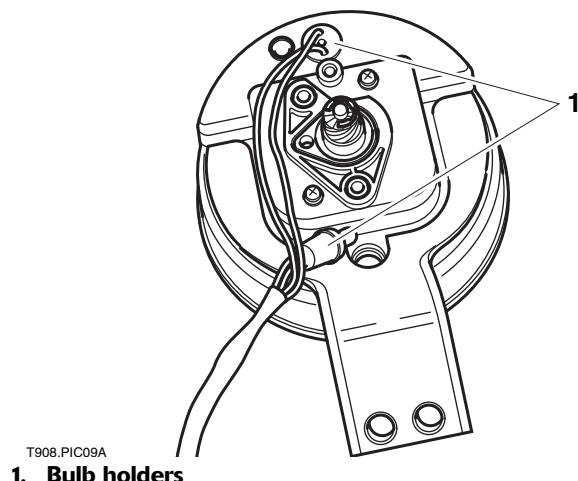
Installation

1. Fit the bulb holders then seat the cover on the speedometer. Refit the fixings and tighten to **2 Nm**.
2. Refit the angle drive.
3. Reconnect the cable to the angle drive and securely tighten the retaining ring.



1. Speedometer cable retaining ring

4. Seat the speedometer housing on the top yoke, tightening its mounting bolts to **9 Nm**.
5. Check for correct operation. Rectify any faults as necessary.



1. Bulb holders

Electrical & Ignition Systems

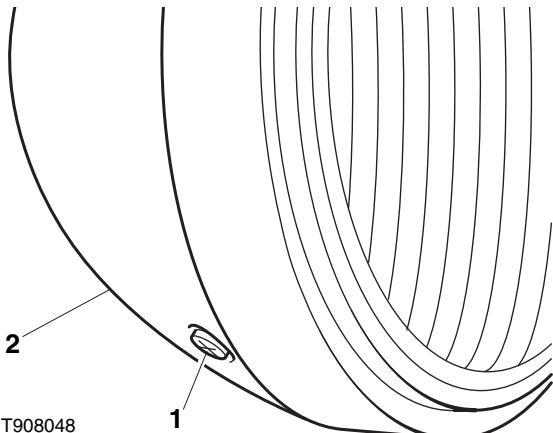
Headlight

Note:

- **Read through the safety precautions before proceeding.**

Removal

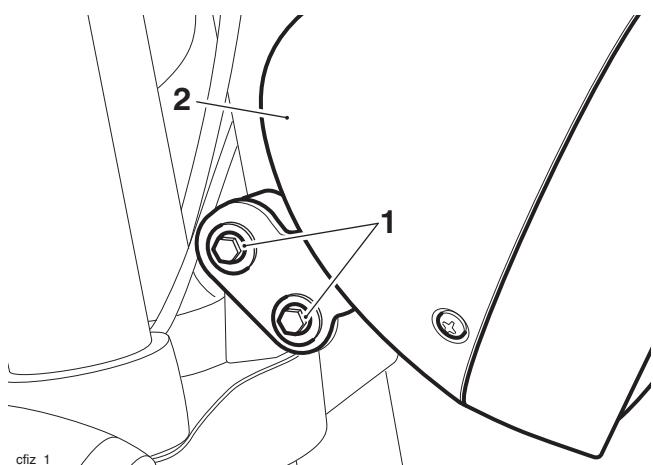
1. Undo the screws and free the headlight rim from the shell.



1. Headlight rim screw

2. Headlight shell

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.
3. Release the vertical adjustment fixing(s) and, while supporting the headlight shell, remove them from the headlight shell and bracket assembly.



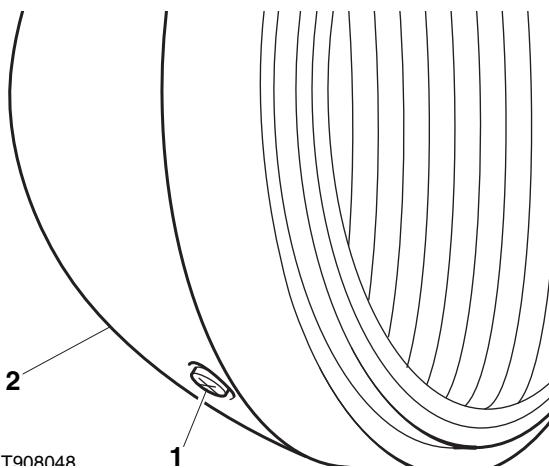
1. Vertical adjustment fixings

2. Headlight shell

4. Free the headlight shell from the wiring harness and remove it from the motorcycle.
5. If necessary, release the headlight bracket fixing and remove the bracket from the motorcycle.

Installation

1. If removed, align the headlight bracket to the lower yoke ensuring that it is correctly located with the locating pin and secure with the original fixing. Tighten the fixing sufficiently to allow restricted movement of the headlight.
2. Feed the wiring harness through the opening in the rear of the headlight shell.
3. Secure the headlight shell to its mounting bracket using the original vertical adjustment fixings. Tighten the fixings sufficiently to allow restricted movement of the headlight.
4. Using the retaining strap located on the inside of the headlight shell, tidily secure the switchgear wiring harnesses leaving the headlight and sidelight wiring harnesses to hang freely.
5. Reconnect the wiring connectors to the headlight and sidelight bulbs.
6. Refit the headlight to the headlight shell and tighten the fixings to **3 Nm**.



1. Headlight rim screw

2. Headlight shell

7. Adjust the headlight beam alignment and tighten the headlight bracket and vertical adjustment fixings (see page 17-21).

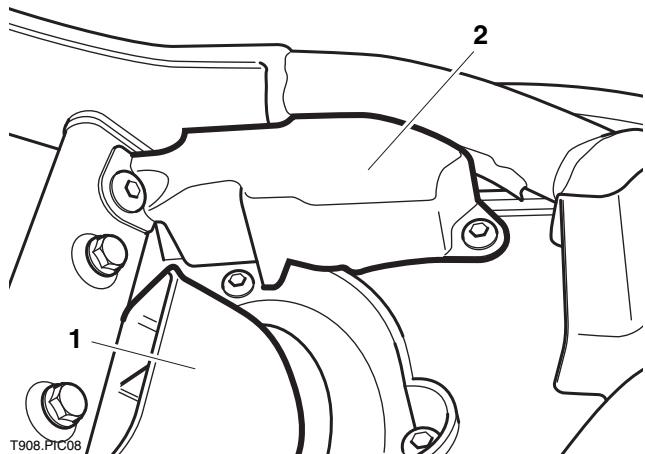
Rear Light

Note:

- Read through the safety precautions before proceeding.**

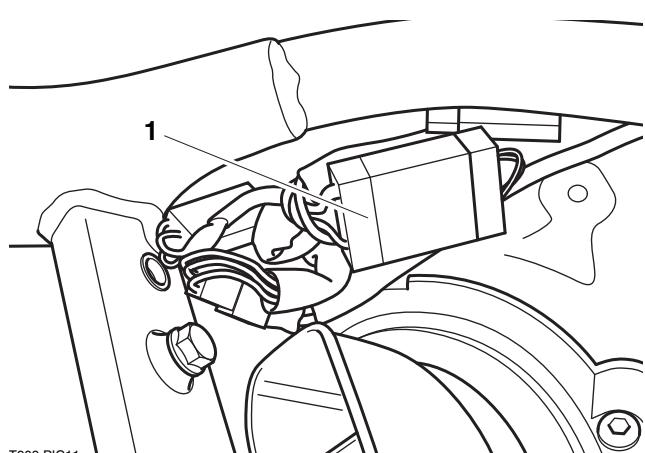
Removal

- Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for America, America LT and Speedmaster from VIN 468390).
- Remove the connector cover from the top of the airbox.



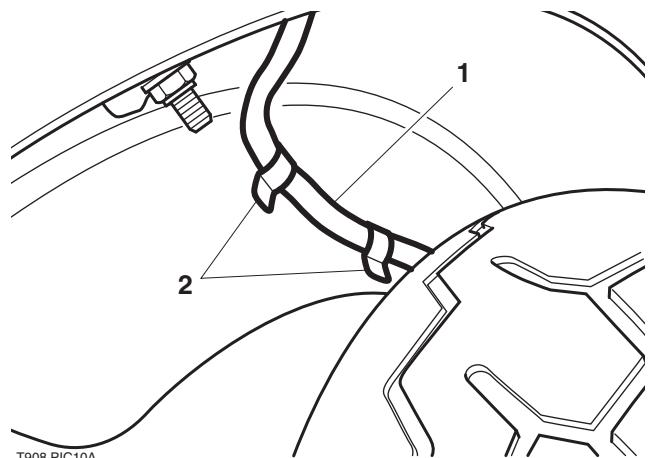
- Airbox**
- Cover**

- Trace through and disconnect the rear light connector.



- Rear light connector location**

- Release the wiring from its clips beneath the mudguard.



- Wiring**
- Clips**

- Release the nuts securing the light to the rear mudguard.
- Remove the light collecting the flanged sleeves from the mounting points.

Installation

- Ensure the three mounting rubbers are correctly fitted to the rear mudguard.
- Fit the rear light assembly to the mudguard. Fit the collars to the mounting rubbers and tighten the mounting nuts to **5 Nm**.
- Securely clip the wiring harness onto the underside of the mudguard.
- Reconnect the light to the main harness then refit the cover to the top of the airbox.
- Refit the seats (see page 16-16) and test the lamp for correct operation. Rectify any faults if necessary.

Electrical & Ignition Systems

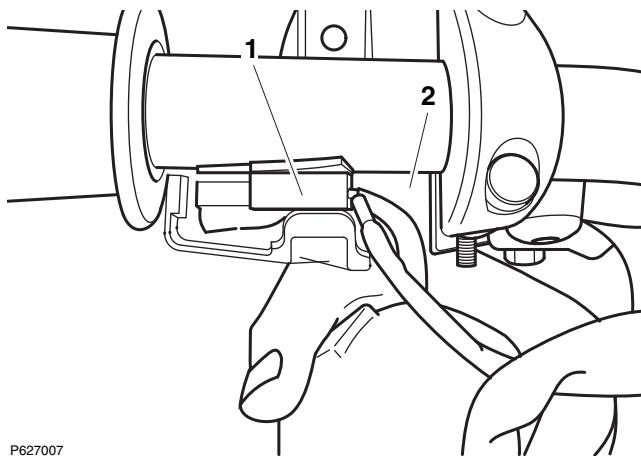
Front Indicator - America up to VIN 468389 & Speedmaster

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.



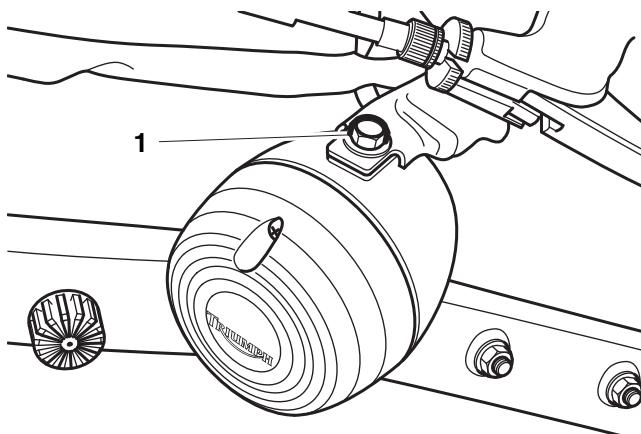
P627007

1. **Cable connector**
2. **Recess**

3. Disconnect the indicator wiring connection.

Note:

- **For Speedmaster from VIN 469050, the front indicators are mounted on top of their brackets.**
4. Release the indicator fixing and remove the indicator.

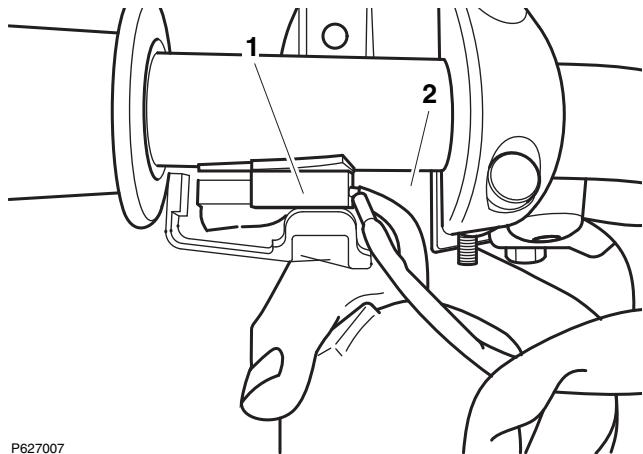


T908.PIC11A

1. **Indicator fixing, Speedmaster up to VIN 469049 shown**

Installation

1. Position the indicator to the bracket, insert the fixing and tighten to **10 Nm**.
2. Reconnect the wiring.
3. Tuck the indicator wiring connector into the recess in the front half of the switchgear.



P627007

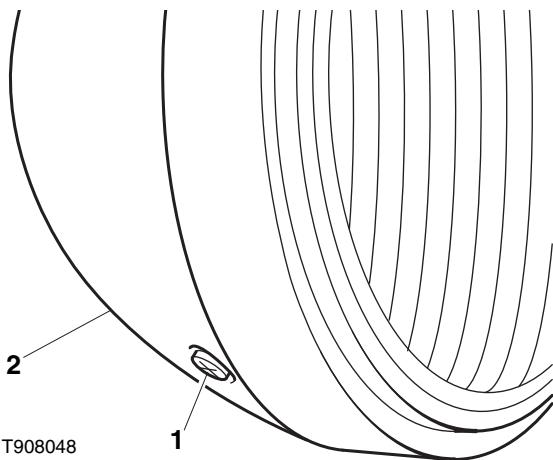
1. **Cable connector**

2. **Recess**

4. Refit the switchgear and secure with its screws.
5. Check the operation of the switch and indicator. Rectify any faults as necessary.

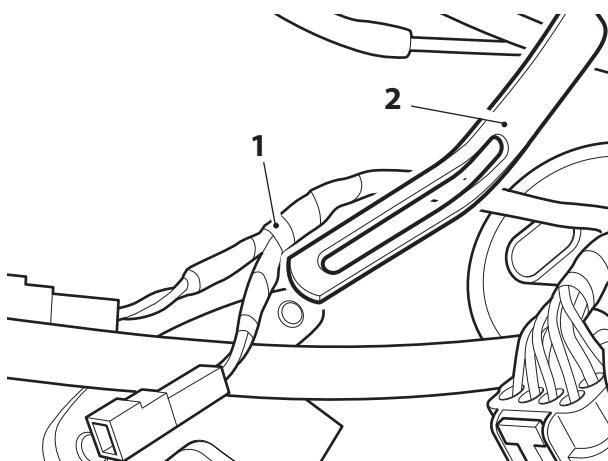
Front Indicator - America and America LT from VIN 468390

1. Disconnect the battery, negative (black) lead first.
2. Remove the screws securing the headlight to the headlight shell.



- 1. Headlight rim screw
2. Headlight shell**

3. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.
4. Release the strap which may be retaining the indicator harness to the headlight shell.

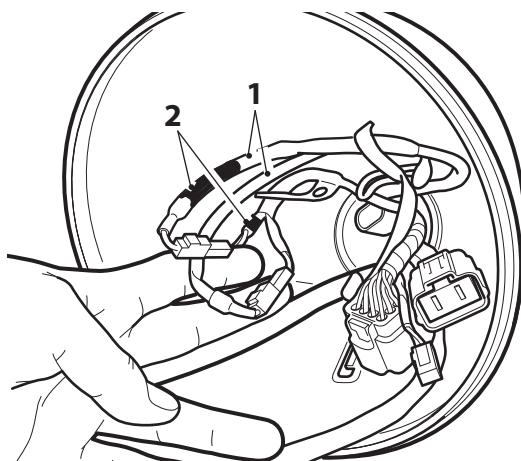


- 1. Indicator harness
2. Strap**

5. Locate the indicator harnesses in the headlight shell and disconnect from the motorcycle wiring harness.

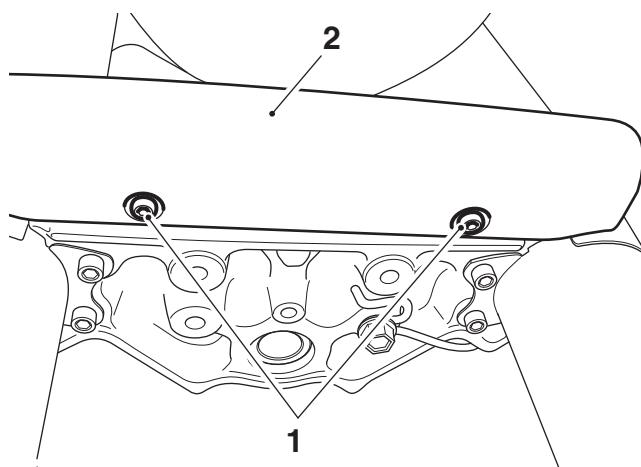
Note:

- Note that the right hand indicator wiring is identified by a section of red tape.



- 1. Indicator harness
2. Red tape, right hand indicator**

6. Carefully feed both direction indicator harnesses out of the headlight shell.
7. Release the bolts and remove the cover from the front indicator bracket. Discard the bolts.



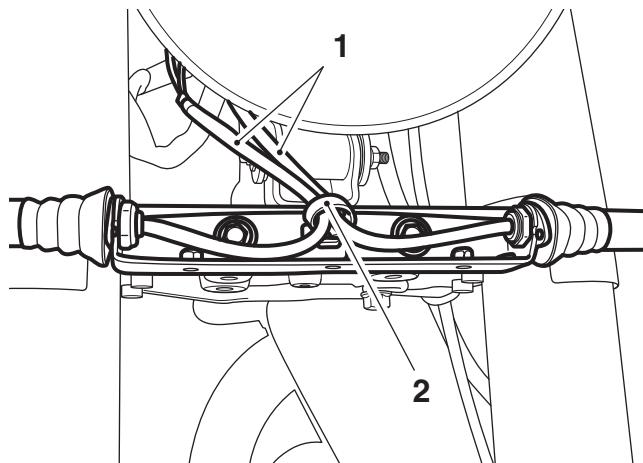
- 1. Bolts
2. Cover**

Note:

- Note the routing of both indicator harnesses for installation.

Electrical & Ignition Systems

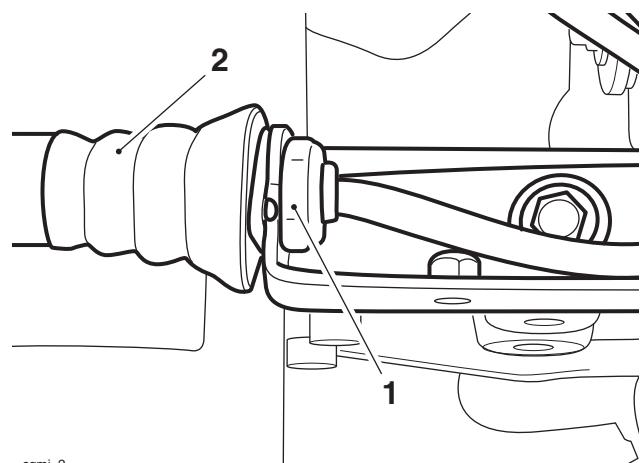
- Carefully feed the direction indicator harnesses through their cable clip.



1. Indicator harnesses

2. Cable clip

- Slacken and remove the mounting nut and its washer. Remove the indicator.



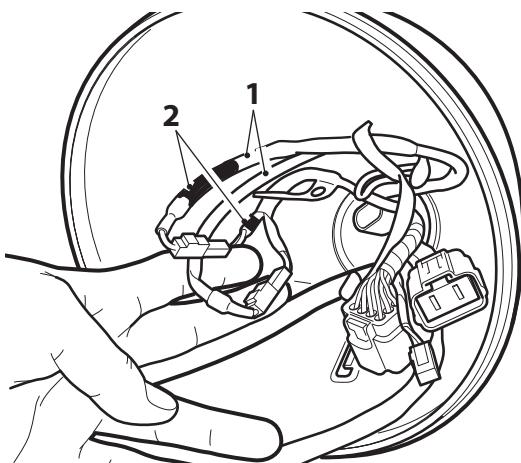
1. Nut

2. Indicator

Installation

- Install the indicator, fit the washer and mounting nut then tighten to **8 Nm**.
- Route the indicator harness through the cable clip and into the headlight shell, as noted for removal.
- Fit the cover to the front indicator bracket and tighten the new bolts to **5 Nm**.

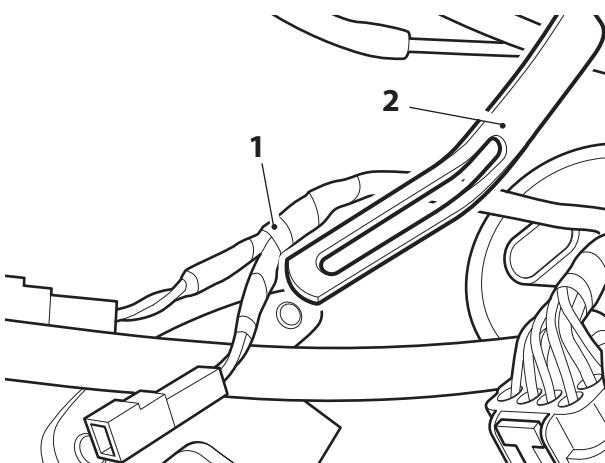
- Reconnect the indicator harnesses to the main harness as noted for removal.



1. Indicator harness

2. Red tape, right hand indicator

- Secure the indicator harnesses in the headlight shell with its strap.



1. Indicator harness

2. Strap

- Reconnect the headlight and position lamp electrical connectors.
- Refit the headlight to the headlight shell and tighten the fixings to **3 Nm**.
- Reconnect the battery, positive (red) lead first.
- Turn the ignition switch to the 'ON' position and check that the indicators and headlight work correctly. Rectify if necessary.

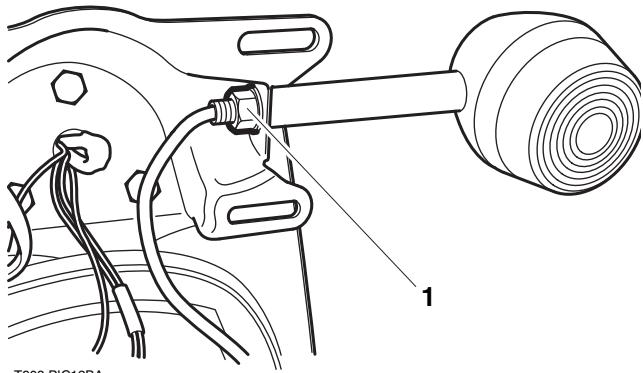
Rear Indicator

Note:

- Read through the safety precautions before proceeding.

Removal

1. Remove the licence 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 licence plate.
3. Test the indicator. Rectify any faults as necessary.

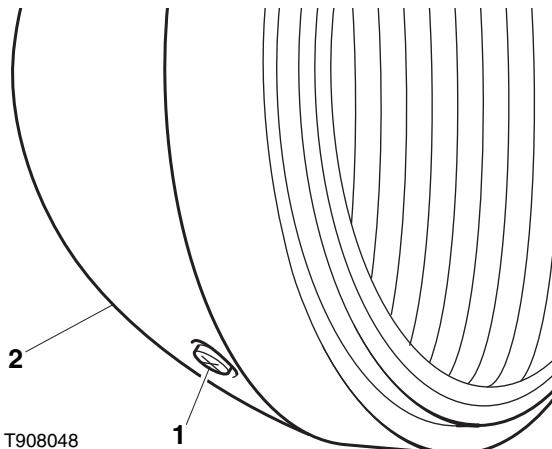
Speedometer Assembly - Models with Cable Driven Speedometer

Note:

- Read through the safety precautions before proceeding.

Removal

1. Undo the screws and free the headlight rim from the shell.



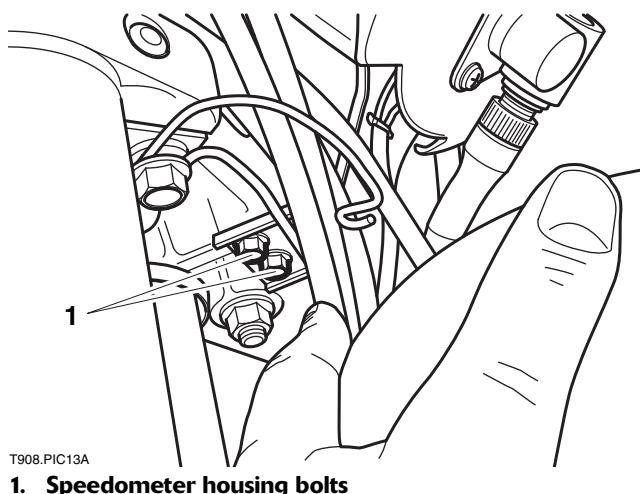
1. Headlight rim screw

2. Headlight shell

2. Disconnect the wiring connectors from the headlight bulb and sidelight bulb and remove the headlight.

Note:

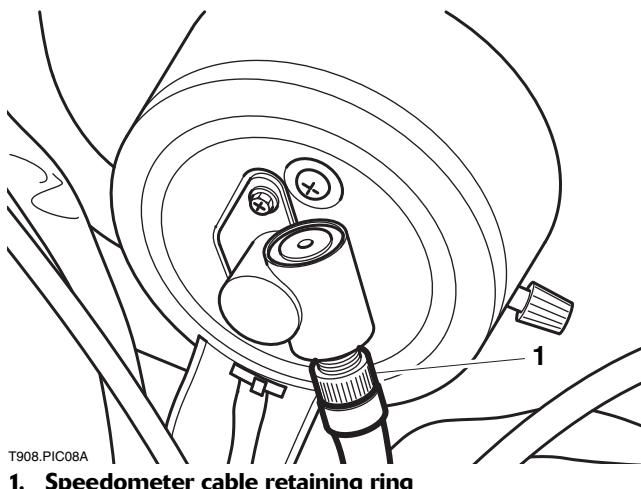
- Carburettor models have one connector, EFI models have two connectors.
- 3. Locate the speedometer housing wiring connector(s) inside the headlight shell and disconnect it/them from the main wiring harness. Free the speedometer wiring from the grommet in the headlight shell.
- 4. Unscrew the mounting bolts and free the speedometer housing from the top yoke.



1. Speedometer housing bolts

Electrical & Ignition Systems

- Unscrew the retaining ring and disconnect the speedometer cable then remove the speedometer assembly.



1. Speedometer cable retaining ring

Installation

- Securely reconnect the cable to the speedometer.
- Locate the speedometer on the top yoke and tighten its mounting bolts to **9 Nm**.

Note:

- Carburettor models have one connector, EFI models have two connectors.**
- Route the wiring into the headlight shell and reconnect the connector(s) to the main harness.
- Reconnect the wiring connectors to the headlight and sidelight bulbs.
- Refit the headlight to the headlight shell and tighten the fixings to **3 Nm**.

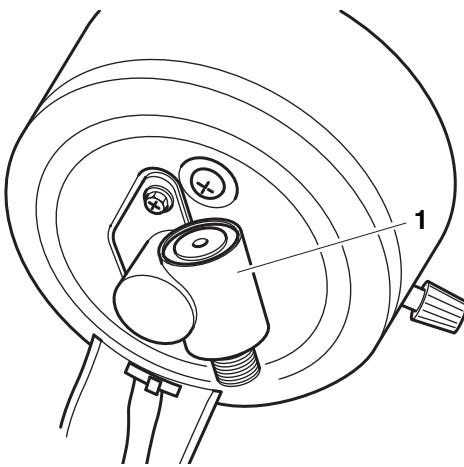
Speedometer - Models with Cable Driven Speedometer

Note:

- Read through the safety precautions before proceeding.**

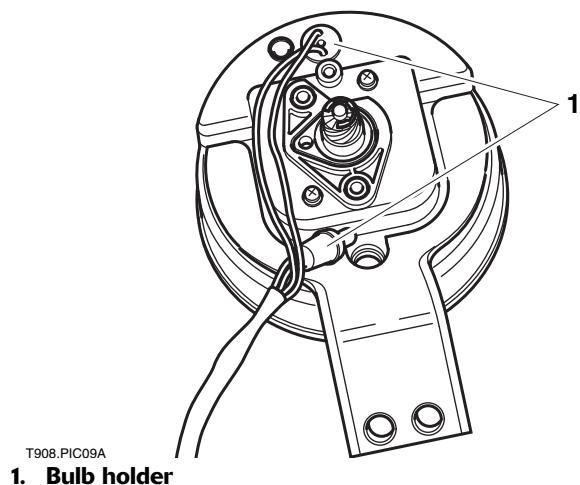
Removal

- Remove the speedometer (see page 17-31).
- Remove the angle drive from the base of the speedometer.



1. Speedometer angle drive

- Speedometer angle drive**
- Unscrew the fixings and remove the cover from the base of the speedometer.
- Undo the retaining screw and remove the trip meter reset knob.
- Free the relevant bulb holders from the speedometer and detach the speedometer.



1. Bulb holder

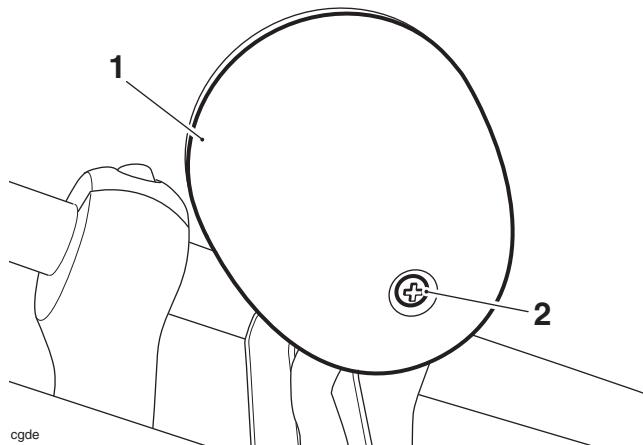
Installation

1. Fit the bulb holders 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.

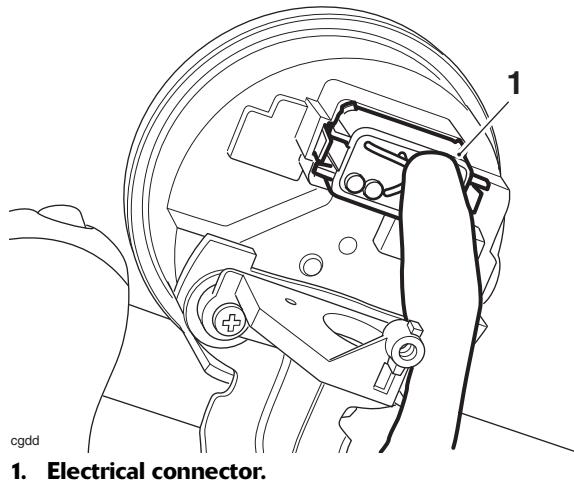
Speedometer or Tachometer - Models with Electronic

Removal

1. **America LT only:** Remove the windscreen (see page 16-26).
2. Disconnect the battery, negative (black) lead first.
3. Remove the screw and remove the instrument cover.



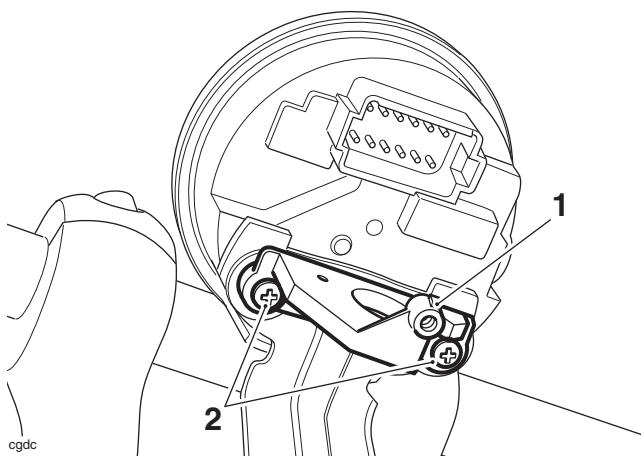
1. Cover
 2. Screw
4. Disconnect the electrical connector.



1. Electrical connector.

Electrical & Ignition Systems

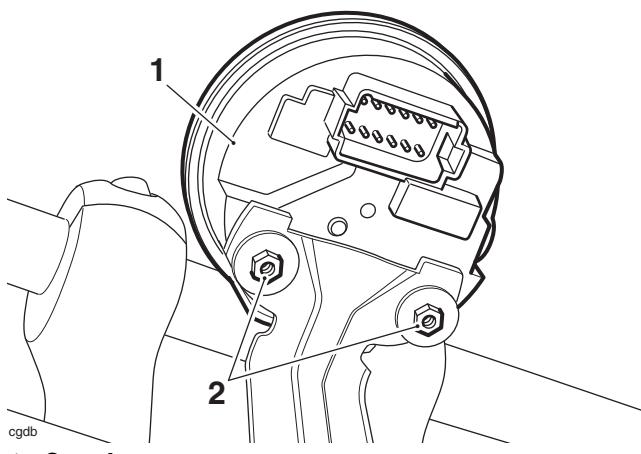
- Release the two screws and remove the cover retaining bracket.



1. Cover retaining bracket

2. Screws

- Release the two screws and remove the Speedometer.



1. Speedometer

2. Screws

- To remove the Speedometer bracket, release the fixings and remove the bracket from the top yoke.

Installation

- If removed, align the instrument mounting bracket to the top yoke and secure with the two fixings. Tighten to **9 Nm**.
- Align the speedometer to the bracket and secure with the two screws. Tighten to **3 Nm**.
- Align the cover retaining bracket to the speedometer screws, fit the screws and tighten to **1 Nm**.
- Reconnect the electrical connector.
- Refit the cover and secure with the screw. Tighten to **1 Nm**.
- Reconnect the battery, positive (red) lead first.
- America LT only:** Refit the windscreens (see page 16-26).

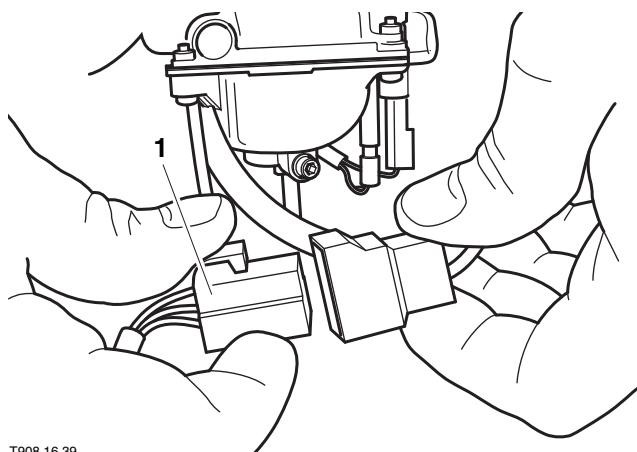
Alternator

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

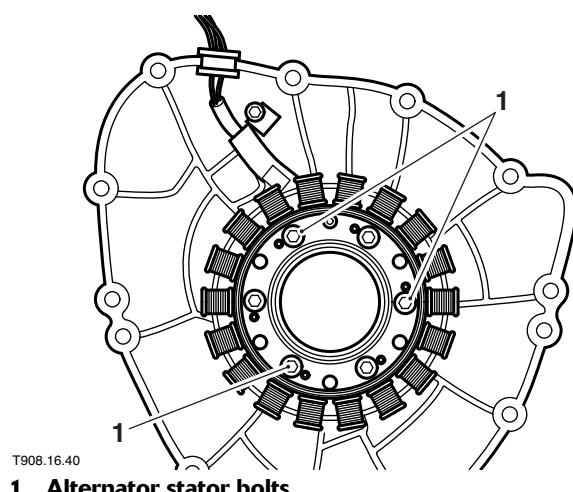
- Disconnect the battery, negative (black) lead first.
- Drain the engine oil (see lubrication section).
- Trace the wiring back from the alternator and disconnect its connector from the main wiring harness.



T908.16.39

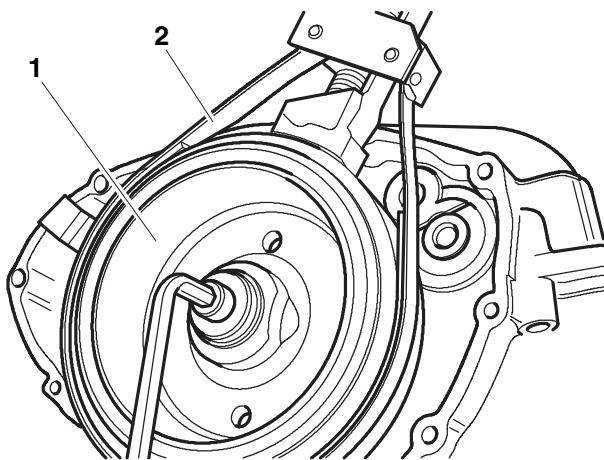
1. Alternator wiring connector

- Slacken and remove the bolts securing the alternator cover to the right side of the crankcase.
- Withdraw the cover from the crankcase, against the pull of the alternator rotor, taking care not to lose the locating pins.
- Remove the cover gasket and discard it.
- 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

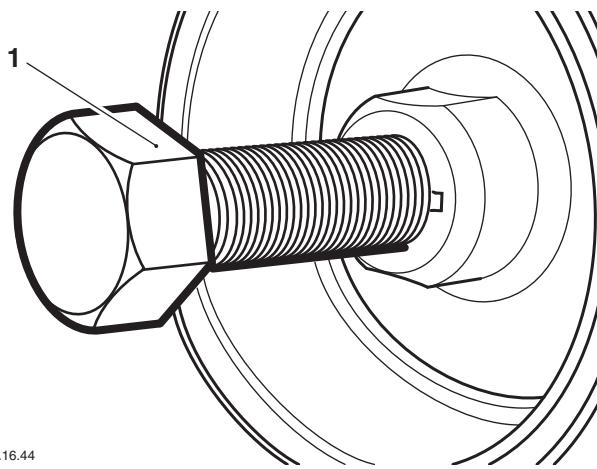
- To remove the rotor, slacken and remove the rotor bolt and washer from the right hand end of the crankshaft. Retain the rotor with the holding tool (T3880375) whilst the bolt is slackened.



1. Rotor

2. Tool T3880375

- With the rotor bolt removed, insert tool T3880203 to the centre of the alternator.



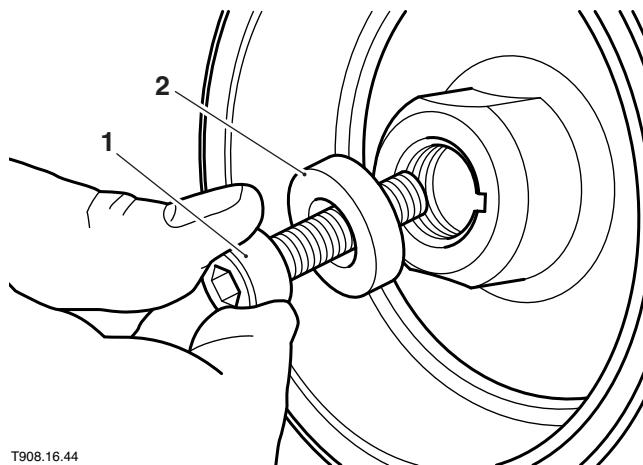
T908.16.44

1. Service tool T3880203

- Tighten tool T3880203, while preventing the crankshaft from turning with tool T3880375, to release the taper seating of the rotor from the crankshaft.
- Withdraw the rotor and tool T3880203 as an assembly. Unscrew the tool from the rotor.
- Remove the Woodruff key from the crankshaft (if loose).

Installation

- Ensure the crankshaft taper and rotor mating surfaces are clean and dry.
- Ensure the Woodruff key is securely fitted to the crankshaft groove.
- Refit the alternator rotor to the crankshaft, aligning its slot with the Woodruff key.
- 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

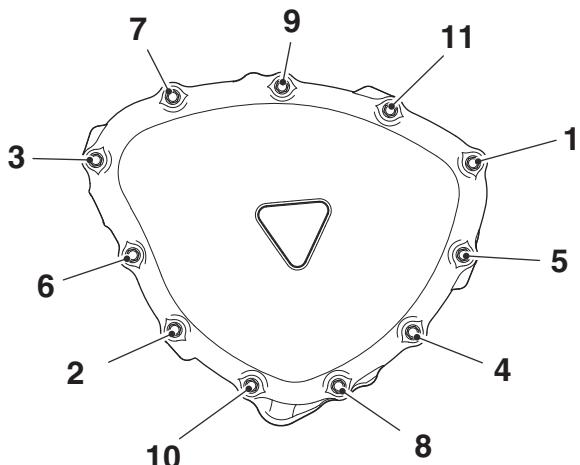
1. Bolt

2. Washer

- Ensure the stator wiring grommet and its location in the cover are clean and dry. Apply silicone sealant (**ThreeBond 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 **7 Nm**.
- 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.
- Fit a new gasket, ensuring the locating pins are in position.
- Refit the cover and install the bolts.
- Tighten bolts 1 to 11 in the sequence shown below to **10 Nm**.

Electrical & Ignition Systems

- Re-tighten fixings 1 and 2 to **10 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.

- Reconnect the alternator wiring connector, ensuring it is correctly routed.
- Refill the engine with oil (see lubrication section).
- Reconnect the battery, positive (red) lead first.

Regulator/rectifier



Warning

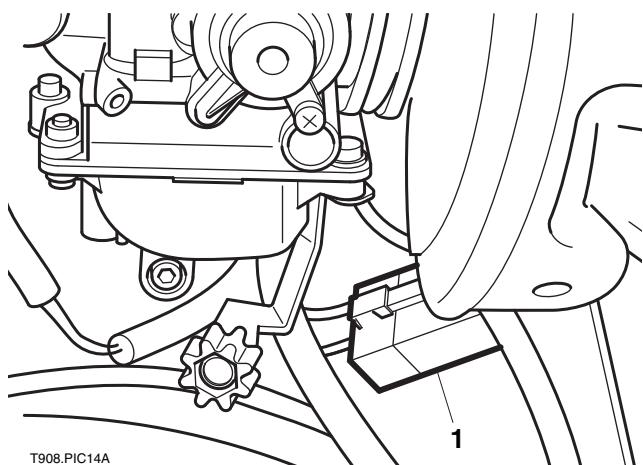
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

Note:

- Read through the safety precautions before proceeding.**

Removal

- Disconnect the battery, negative (black) lead first.
- Raise and support the rear of the motorcycle.
- Locate the wiring connection for the regulator which is situated beneath the carburetors. Disconnect the regulator's multiplug.



1. Wiring connector

- Release the fixings and withdraw the regulator.

Note:

- On California models, removal of the evaporative canister creates space for the regulator to be removed.**

Installation

- Locate the regulator/rectifier on the bracket and tighten its mounting bolts to **9 Nm**.
- Route the wiring behind the engine to the space beneath the carburetors.
- Connect the regulator to the main harness.
- Refit the evaporative canister if removed.
- Lower the motorcycle to the ground and park on the sidestand.
- Reconnect the battery, positive (red) lead first.

Alternator Stator

The stator is an assembly of 18 coils, arranged into three phases. It is possible to check for continuity, and short circuits through the coils to earth.

Note:

- **Only repairs to the stator harness between the connector and the harness entry point into the crankcase are permitted.**

- **Do not attempt to repair the stator coils.**
- **If the battery is not fully charged, the charging voltage may be lower than specified when checking at 2000 rpm.**
- **Ensure all additional accessories (auxiliary lights, heated grips etc.) are switched off.**

Fault Code	Possible cause	Action
Battery not charging	Main fuse	Check the condition of fuse Number 11.
	Battery	Check the condition of the battery. Test the battery using the BatteryMate 150-9. Refer to the instructions supplied with the BatteryMate 150-9. Ensure the battery is serviceable:-
	Alternator	Proceed to pinpoint test 1.
	Rectifier/Regulator	Test the rectifier/regulator (see page 17-39).

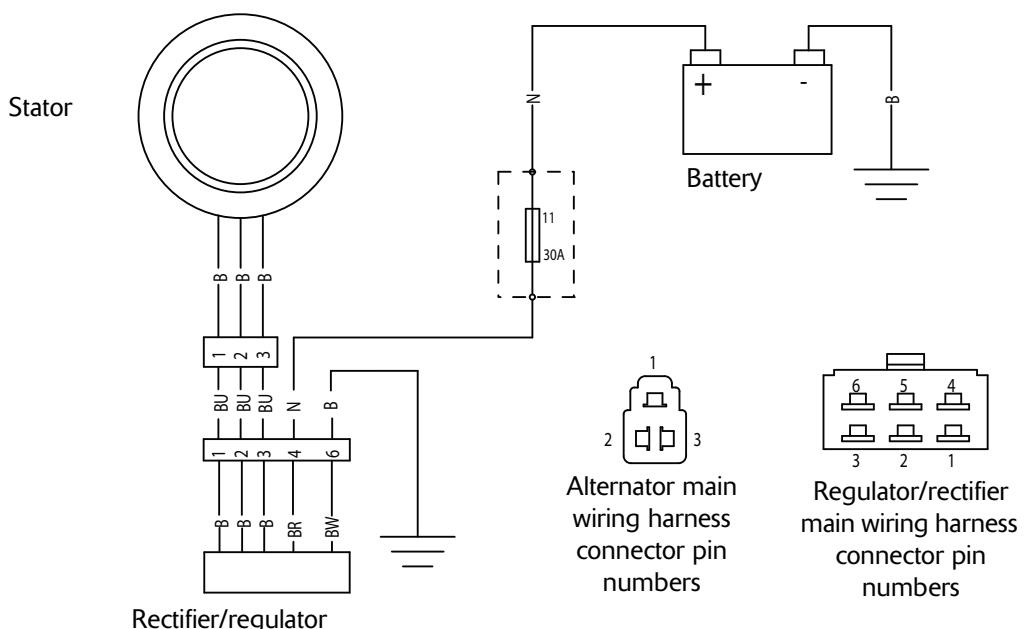
Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - Battery positive (+) - Battery negative (-) - Rectifier/regulator to main wiring harness connector pin 1 - Rectifier/regulator to main wiring harness connector pin 2 - Rectifier/regulator to main wiring harness connector pin 3 - Rectifier/regulator to main wiring harness connector pin 4 - Rectifier/regulator to main wiring harness connector pin 6	OK	Proceed to test 2
	Faulty	Rectify fault, proceed to test 6
2 Check cable and terminal integrity: - Alternator connector pin 1 - Alternator connector pin 2 - Alternator connector pin 3	OK	Disconnect the battery leads, negative (black) lead first. Disconnect rectifier/regulator to main wiring harness connector (6 pin). Disconnect the alternator connector (3 pin). Proceed to test 3
	Faulty	Rectify fault, proceed to test 6

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Test	Result	Action
3 Check cable continuity: - Rectifier/regulator main harness connector pin 6 to battery lead negative - Rectifier/regulator main harness connector pin 4 to battery lead positive Rectifier/regulator main harness connector pin 1 to alternator main harness connector pin 1 Rectifier/regulator main harness connector pin 2 to alternator main harness connector pin 2 Rectifier/regulator main harness connector pin 3 to alternator main harness connector pin 3	OK	Reconnect the battery leads, positive (red) lead first. Reconnect the rectifier/regulator to main wiring harness connector (6 pin). Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 6
4 Check resistance through the coils: - Alternator harness pin 1 to 2 - Alternator harness pin 2 to 3 - Alternator harness pin 3 to 1	0.3Ω to 0.6Ω	Proceed to test 5
Open circuit or short circuit	If the fault is between the connector and the crankcase, repair the harness. Proceed to test 6 If the fault is after the crankcase, replace the unit. Proceed to test 6	
5 Check for short to earth: - Alternator harness pin 1 to metal frame - Alternator harness pin 2 to metal frame - Alternator harness pin 3 to metal frame	Open circuit	Proceed to test 6
Short circuit	Replace unit. Proceed to test 6	
6 Reconnect the harness and run the engine. Check the charging voltage at 2000 rpm:	13.5V to 15V	Action complete - quit test
	Fault still present	Test rectifier/regulator (see page 17-39)
		If rectifier/regulator is serviceable, contact Triumph service

Circuit Diagram



Rectifier/Regulator

Internally the rectifier/regulator consists of:

- six diodes
- a voltage controller and three thyristors.

The diodes are arranged with one diode connected between each black input wire and each black/red and black/white output wires.

The diodes convert the AC voltage to DC voltage.

Each black input wire is also connected to a thyristor which is in turn connected to ground. When the DC

voltage at the battery reaches the required level, the voltage controller sends a signal to all three thyristors. The thyristors then conduct and effectively short circuit the stator until the DC voltage drops to an acceptable level.

It is possible for any number of these diodes to fail, reducing the power output of the unit. This may not be obvious until maximum power is required by the ignition, lighting and accessories etc.

The diodes can be checked using a multimeter on DIODE setting.

Note:

- **This test does not check for voltage regulation.**

Fault Code	Possible cause	Action
Battery not charging	Main fuse	Check the condition of the fuse number 11:
	Battery	Check the condition of the battery. Test the battery using the BatteryMate 150-9. Refer to the instructions supplied with the BatteryMate 150-9. Ensure the battery is serviceable.
	Rectifier/Regulator	Disconnect the rectifier regulator connectors from the main wiring harness. Proceed to pinpoint test 1.
	Alternator	Test the alternator stator (see page 17-37).

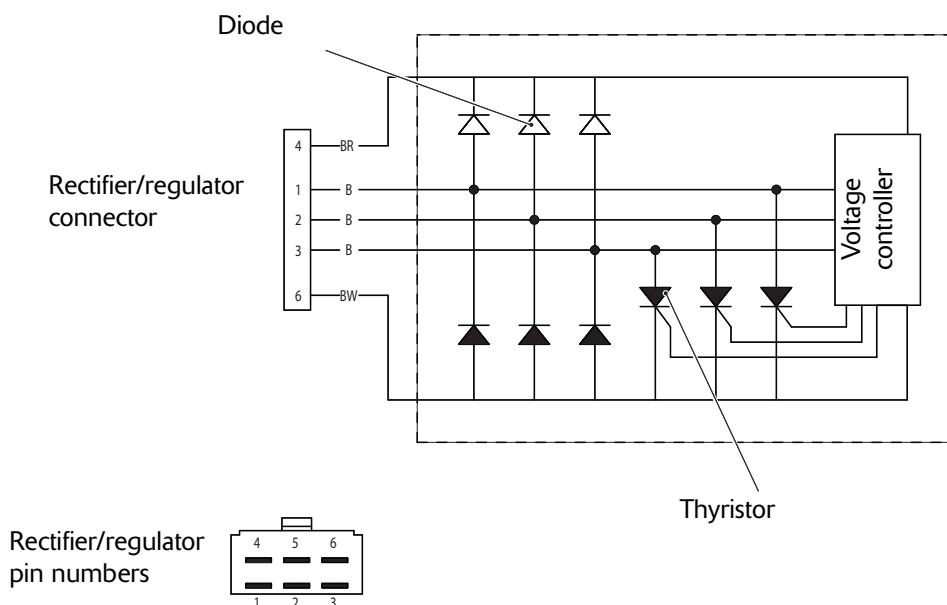
Pinpoint Tests

Test	Result	Action
1 Check diodes foward bias: - Positive (+) probe to rectifier/regulator connector pin 6 to: Negative (-) probe to rectifier/regulator connector pin 1 Negative (-) probe to rectifier/regulator connector pin 2 Negative (-) probe to rectifier/regulator connector pin 3	0.4V to 0.7V	Proceed to test 2
	Open or short circuit	Replace unit. Proceed to test 5
2 Check diodes forward bias: - Negative (-) probe to rectifier/regulator connector pin 4 to: Positive (+) probe to rectifier/regulator connector pin 1 Positive (+) probe to rectifier/regulator connector pin 2 Positive (+) probe to rectifier/regulator connector pin 3	0.4V to 0.7V	Proceed to test 3
	Open or short circuit	Replace unit. Proceed to test 5

Electrical & Ignition Systems

Test	Result	Action
3 Check diodes reverse bias: - Positive (+) probe to rectifier/regulator connector pin 4 to: Negative (-) probe to rectifier/regulator connector pin 1 Negative (-) probe to rectifier/regulator connector pin 2 Negative (-) probe to rectifier/regulator connector pin 3	Open circuit or 'OL' on meter	Proceed to test 4
	A voltage reading or short circuit	Replace unit. Proceed to test 5
4 Check diodes reverse bias: - Negative (-) probe to rectifier/regulator connector pin 6 to: Positive (+) probe to rectifier/regulator connector pin 1 Positive (+) probe to rectifier/regulator connector pin 2 Positive (+) probe to rectifier/regulator connector pin 3	Open circuit or 'OL' on meter	Proceed to test 5
	A voltage reading or short circuit	Replace unit. Proceed to test 5
5 Reconnect the harness and run the engine. Check the charging voltage at 2000 rpm:	13.5V to 15V	Action complete - quit test
	Fault still present	Test alternator stator (see page 17-37)
		If alternator stator is serviceable, contact Triumph service

Circuit Diagram



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, negative (black) lead 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, positive (red) lead first.

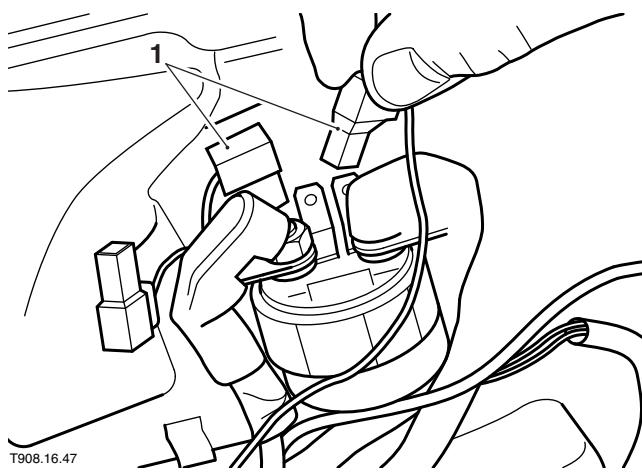
Starter Solenoid - America up to VIN 468389 and Speedmaster up to VIN 469049

Note:

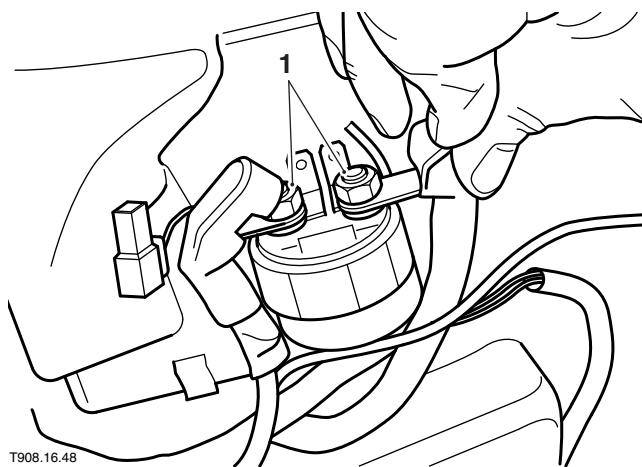
- Read through the safety precautions before proceeding.
- The starter solenoid is located behind the right hand side cover.

Removal

1. Disconnect the battery, negative (black) lead first.
2. Remove the right side cover.
3. Disconnect the wiring connectors from the solenoid.



4. Slacken and remove the nuts and washers and detach the battery and starter leads from the solenoid.

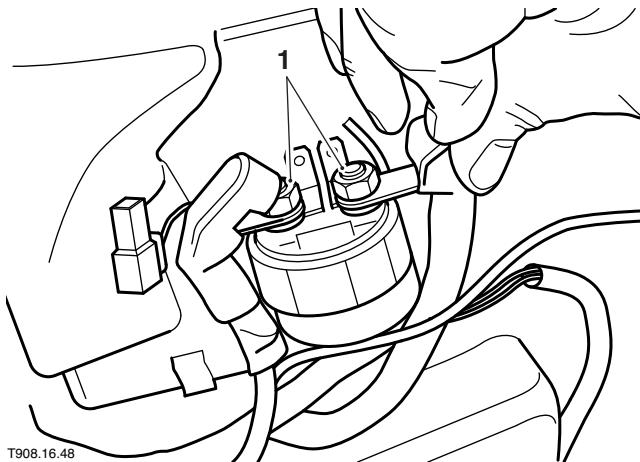


5. Free the solenoid mounting rubber from the airbox and remove the solenoid from the motorcycle.

Electrical & Ignition Systems

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 **5 Nm**.



1. **Battery/starter lead nuts**

3. Refit the side cover.
4. Reconnect the battery, positive (red) lead first.

Starter Solenoid - America and America LT from VIN 468390 and Speedmaster from VIN 469050

Note:

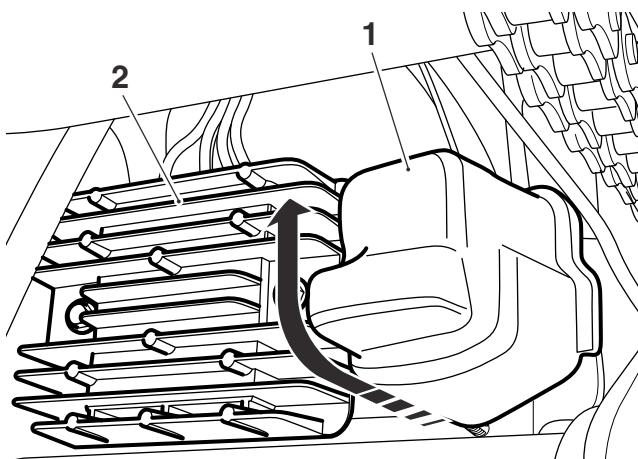
- **Read through the safety precautions before proceeding.**
- **The starter solenoid is located to the right hand side of the regulator/rectifier unit.**

Removal

1. Disconnect the battery, negative (black) lead first.

Note:

- **Note how the battery/starter leads enter the front of the rubber cover for installation.**
- 2. To access the solenoid, carefully lift the bottom of the rubber cover up and over the top of the solenoid.

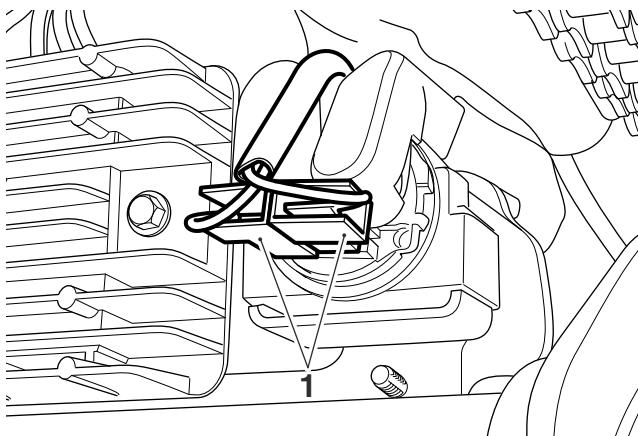


1. **Rubber cover, back**

2. **Regulator/rectifier**

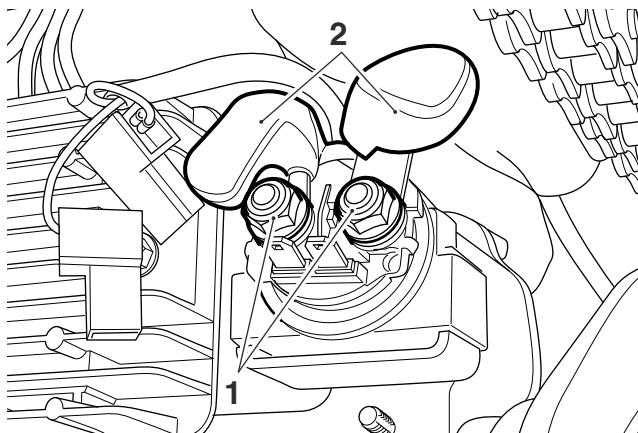
Note:

- **Note the position and orientation of the solenoid cables for installation.**
- 3. Disconnect the wiring connectors from the solenoid.



1. **Wiring connectors**

- Lift the rubber covers then slacken and remove the nuts and washers securing the battery and starter leads to the solenoid.



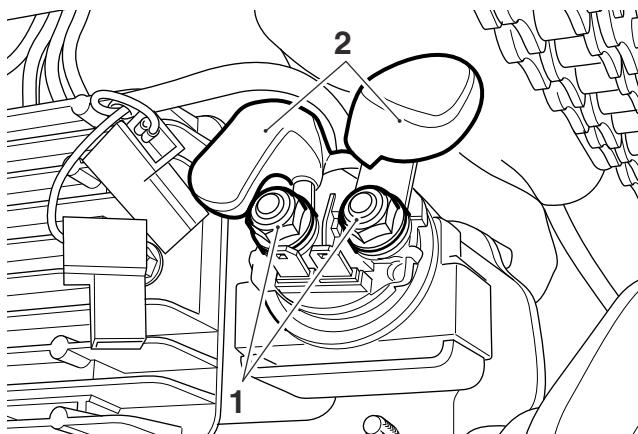
1. Battery/starter lead nuts

2. Rubber covers

- Detach the battery and starter leads and free the solenoid mounting rubber from the frame and remove it from the motorcycle.

Installation

- Fit the solenoid and mounting rubber, locating the rubber on the tabs on the airbox.
- Reconnect the wiring connectors and leads to the relay as noted for removal, tightening the terminal nuts to **5 Nm**. Refit the rubber covers over the terminals.



1. Battery/starter lead nuts

2. Rubber covers

- Carefully refit the rubber cover over the solenoid connectors as noted for removal.
- Reconnect the battery, positive (red) lead first.

Ignition System Description - Carburettor models

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 carburetors, 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).

Electrical & Ignition Systems

Ignition Pick-up Coil (Carburettor models)

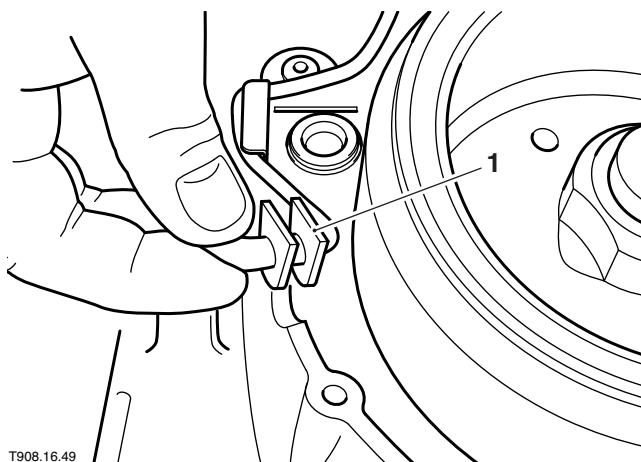
Crankshaft position sensor (EFI models)

Note:

- **Read through the safety precautions before proceeding.**

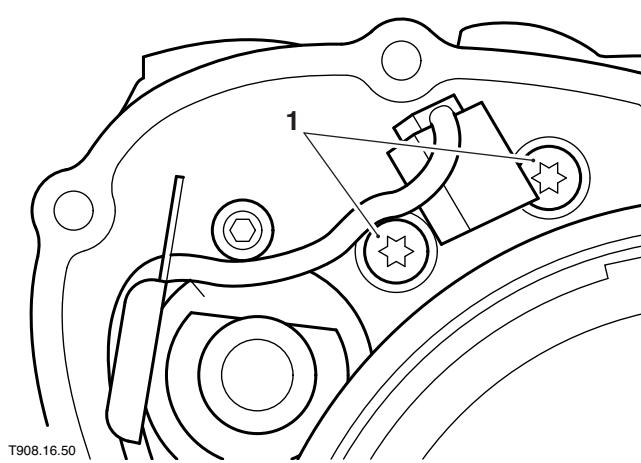
Removal

1. Disconnect the battery, negative (black) lead first.
2. Remove the alternator cover (see page 17-34).
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

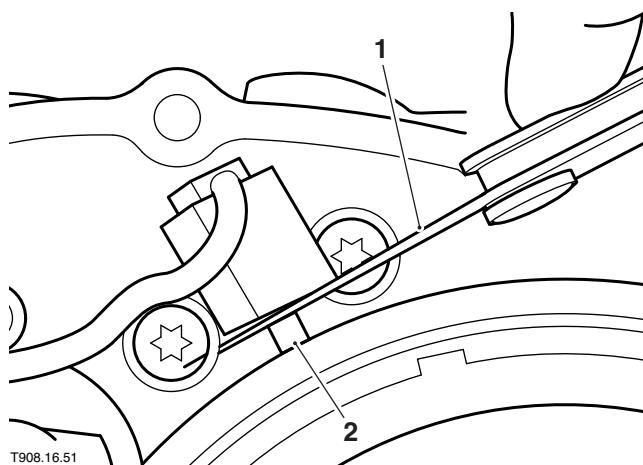
5. Undo the retaining screws and remove the pick-up coil from the crankcase.



1. Pick-up coil screws

Installation

1. Ensure the wiring grommet and crankcase cutout are clean and dry.
2. Apply silicone sealant (ThreeBond 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 0.8 mm +/- 0.2 mm then tighten the new 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. Refit the cover and install the bolts. Hand-tighten all bolts then evenly and progressively tighten them to **10 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.

7. Reconnect the battery, positive (red) lead first.

Throttle Position Sensor

Carburettor Models

The throttle position sensor is an integral part of the carburetors and is not available separately. If the sensor is faulty, the carburetors must be renewed.



Warning

Never slacken the throttle position sensor screws (the sensor is retained by tamper-proof 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.

Fuel Injected Models

The throttle position sensor is available separately from the throttle body. See page 10B-97 of the fuel chapter for replacement instructions.

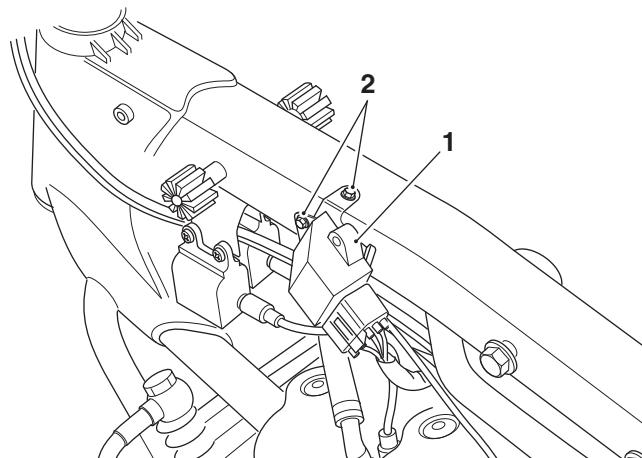
Igniter Unit - Carburettor models only

Note:

- Read through the safety precautions before proceeding.

Removal

1. Remove the seats (see page 16-15 for America, see page 16-16 for Speedmaster).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page 10A-11).
4. Disconnect the wiring connector then remove the fixings and remove the igniter unit from the frame.



1. Igniter unit
2. Fixings

Installation

1. Locate the igniter unit on the frame and tighten its fixings to **8 Nm**.
2. Securely reconnect the igniter wiring connector.
3. Reconnect the battery, positive (red) lead first.
4. Install the fuel tank (see page 10A-12).
5. Install the seat (see page 16-16).

Electrical & Ignition Systems

Pinpoint Tests - Igniter

Igniter Input Tests:

Disconnect the igniter and probe the pins of the harness connector with a multimeter.

The ignition key should be in the off position for the pinpoint tests. Only have the ignition key in the on position if stated in the pinpoint test.

If the engine will not turn over when trying to start the engine, rectify the starter motor circuit fault first.

For the igniter circuit diagram, see page 17-48.

Test	Result	Action
1 Check continuity to ground: - Pin 1 to battery negative (-) terminal	OK	Proceed to test 2
	Open Circuit	Inspect and if necessary rectify fault in the wires, proceed to test 2
2 Check for 12 Volt supply: - Pin 2 to battery negative (-) terminal, with the ignition switch on	Battery voltage	Turn the ignition switch off. Proceed to test 3
	Below battery voltage	Turn the ignition switch off. Inspect and if necessary rectify fault in the wires. Proceed to test 3
3 Check resistance through the TPS sensor: - Pin 4 to pin 5	3.5Ω to 4.5MΩ	Proceed to test 4
	Outside of range	Inspect and if necessary rectify fault in the wires or TPS sensor. Proceed to test 4
4 Check the crank sensor signal AC Voltage: - Pin 6 to pin 5	0.1 ACV - 0.2 ACV	Proceed to test 5
	Outside of range	Inspect and if necessary rectify fault in the wires or crank sensor. Proceed to test 5
5 Check the SAI valve connection and supply (if fitted): - Pin 7 to ground with the ignition switch on	Battery voltage	Proceed to test 6
	Below battery voltage	Inspect and if necessary rectify fault in the wires or SAI valve. Proceed to test 6
6 Check coil/s connection and supply: - Pin 8 to ground with the ignition switch on - Pin 14 to ground with the ignition switch on	Battery voltage	Proceed to test 7
	Below battery voltage	Turn the ignition switch off. Inspect and if necessary rectify fault in the wires or coil/s. Proceed to test 7
7 Check the side stand switch connection and continuity to ground: - Pin 9 to ground with the side stand up and the clutch released	OK	Proceed to test 8
	Open circuit	Inspect and if necessary rectify fault in the wires or side stand switch. Proceed to test 8
8 Check neutral switch to ground: - Pin 10 to ground	OK	Proceed to test 9
	Open circuit	Inspect and if necessary rectify fault in the wires or side stand switch. Proceed to test 9
9 Check switched purge valve connection and supply (if fitted): - Pin 16 to ground	Battery voltage	Proceed to test 10
	Below battery voltage	Inspect and if necessary rectify fault in the wires or purge valve. Proceed to test 10
10 Check the resistance through the TPS sensor: - Pin 17 to pin 4, open and close the throttle	1.5Ω to 4MΩ varying with throttle position	Proceed to test 11
	Outside of range	Inspect and if necessary rectify fault in the wires or TPS sensor. Proceed to test 11
11 Reconnect the harness, check gear, side stand and clutch positions, then start the engine.	Engine operates correctly	Action complete, quit test
	Fault still present	Proceed to igniter output tests

Igniter Output Pinpoint Tests:

Only test the igniter outputs once the igniter inputs have been tested and found to be working correctly.

Ensure the ignition switch is off before removing/refitting or disconnecting/connecting any components.

Disconnect or remove each component for its test then refit or connect each component before moving on to next component test.

Perform each test with the ignition on unless otherwise stated.

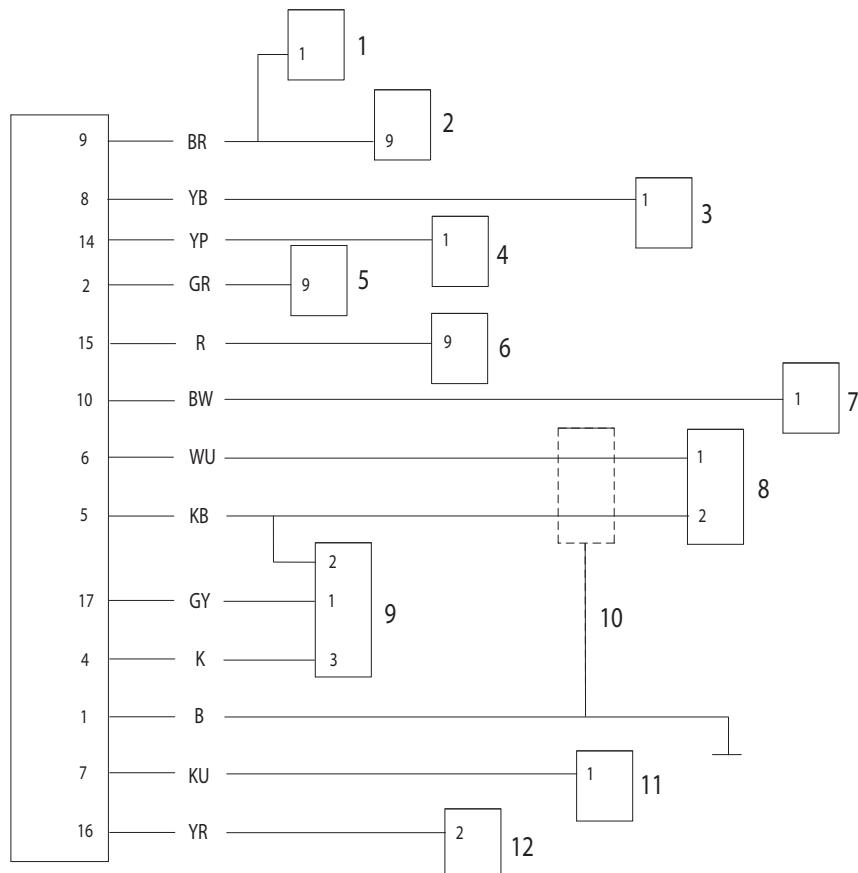
For the igniter circuit diagram, see page 17-48.

Test	Result	Action
1 Disconnect the TPS sensor. Check output to TPS sensor: - Pin 2 to pin 3	4.5 V to 5.5 V	Proceed to test 2
	Outside of range	Replace the igniter. Proceed to test 10
2 Disconnect the crank sensor. Check continuity to ground: - Pin 2 to ground with the ignition switch off	OK	Proceed to test 3
	Open circuit or resistance is read	Replace the igniter. Proceed to test 10
3 Disconnect the side stand switch. Check output to side stand switch: - Pin 1 to ground with the clutch lever released	4.5 V to 5.5 V	Proceed to test 4
	Outside of range	Replace the igniter. Proceed to test 10
4 Disconnect the left hand switch cube. Check output to clutch switch: - Pin 9 to ground with the side stand down	4.5 V to 5.5 V	Proceed to test 5
	Outside of range	Replace the igniter. Proceed to test 10
5 Disconnect the neutral switch. Check output to neutral switch: - Pin 1 to ground	Battery voltage	Proceed to test 6
	Below battery voltage	Replace the igniter. Proceed to test 10
6 Disconnect the instruments. Check tachometer output to instruments: - Pin 9 to ground with engine cranking or running	2 - 10 ACV	Proceed to test 7
	Outside of range	Replace the igniter. Proceed to test 10
7 Disconnect all coils. Check output to coil/s: - Pin 1 to battery positive terminal when cranking the engine. Ensure all coils are disconnected.	Greater than 0.1 ACV	Proceed to test 8
	0 V	Replace the igniter. Proceed to test 10
8 Disconnect the SAI valve (if fitted). Check output to SAI valve: - Place a 1.7 W instrument type bulb across pin 1 and pin 2	Bulb lights when engine speed exceeds 4000 rpm	Proceed to test 9
	Bulb remains off when engine speed exceeds 4000 rpm	Replace the igniter. Proceed to test 10
9 Disconnect the switched purge valve (if fitted). Check output to switched purge: - Place a 1.7 W instrument type bulb across pin 1 and pin 2	Bulb lights when engine speed exceeds 2000 rpm	Proceed to test 9
	Bulb remains off when engine speed exceeds 2000 rpm	Replace the igniter. Proceed to test 10

Electrical & Ignition Systems

Test	Result	Action
10 Reconnect the harness, check gear, side stand and clutch positions, then start the engine	Engine operates correctly	Action complete, quit test
	Fault still present	Contact Triumph service

Igniter Circuit Diagram



1. Side stand switch
2. Clutch switch
3. Coil
4. Coil
5. Alarm
6. Instruments

7. Neutral switch
8. Crank sensor
9. Throttle potentiometer
10. Shielding
11. SAI solenoid
12. Switched purge valve

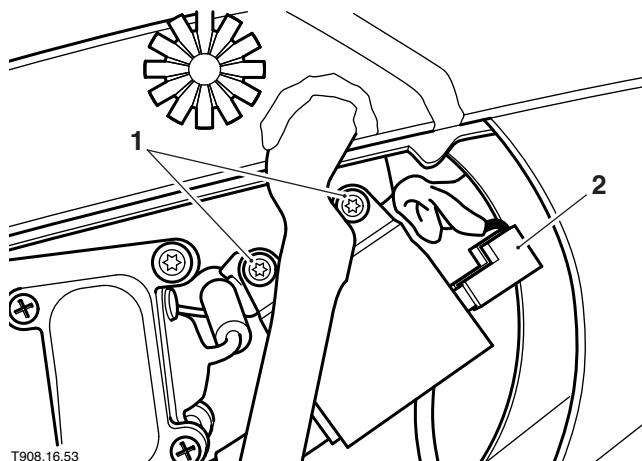
Ignition HT Coils

Note:

- **Read through the safety precautions before proceeding.**

Removal

1. Remove the seats (see page 16-15 for America up to VIN 468389, see page 16-16 for America, America LT and Speedmaster from VIN 468390).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page 10A-11 for carburettor models or page 10B-76 for fuel injected models).
4. Disconnect the wiring connectors from the coils.



1. **Mounting screws**
2. **Wiring connectors**

5. Free the plug caps from the spark plugs.
6. Undo the screws and remove the ignition HT coil(s).

Installation

1. Fit the coils to the frame and securely tighten its screws.
2. Reconnect the wiring connectors to the coils and reconnect the plug caps to the spark plugs.
3. Install the fuel tank (see page 10A-12 for carburettor models or page 10B-77 for fuel injected models).
4. Reconnect the battery, positive (red) lead first.
5. Refit the seat (see page 16-16).

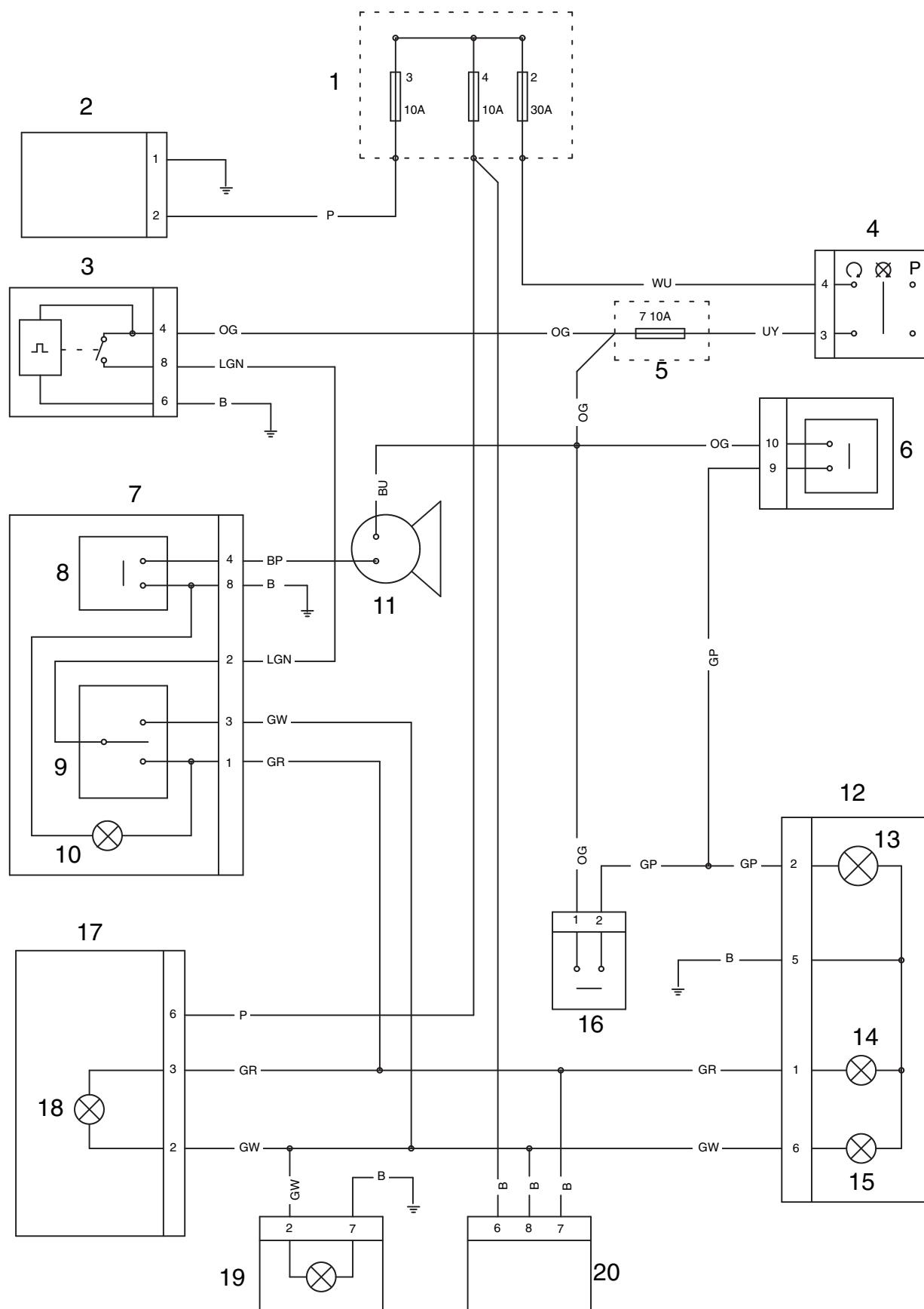
Electrical & Ignition Systems

Key to Auxiliary Circuit Diagram - America & Speedmaster - Carburettor Models

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 - Carburettor Models



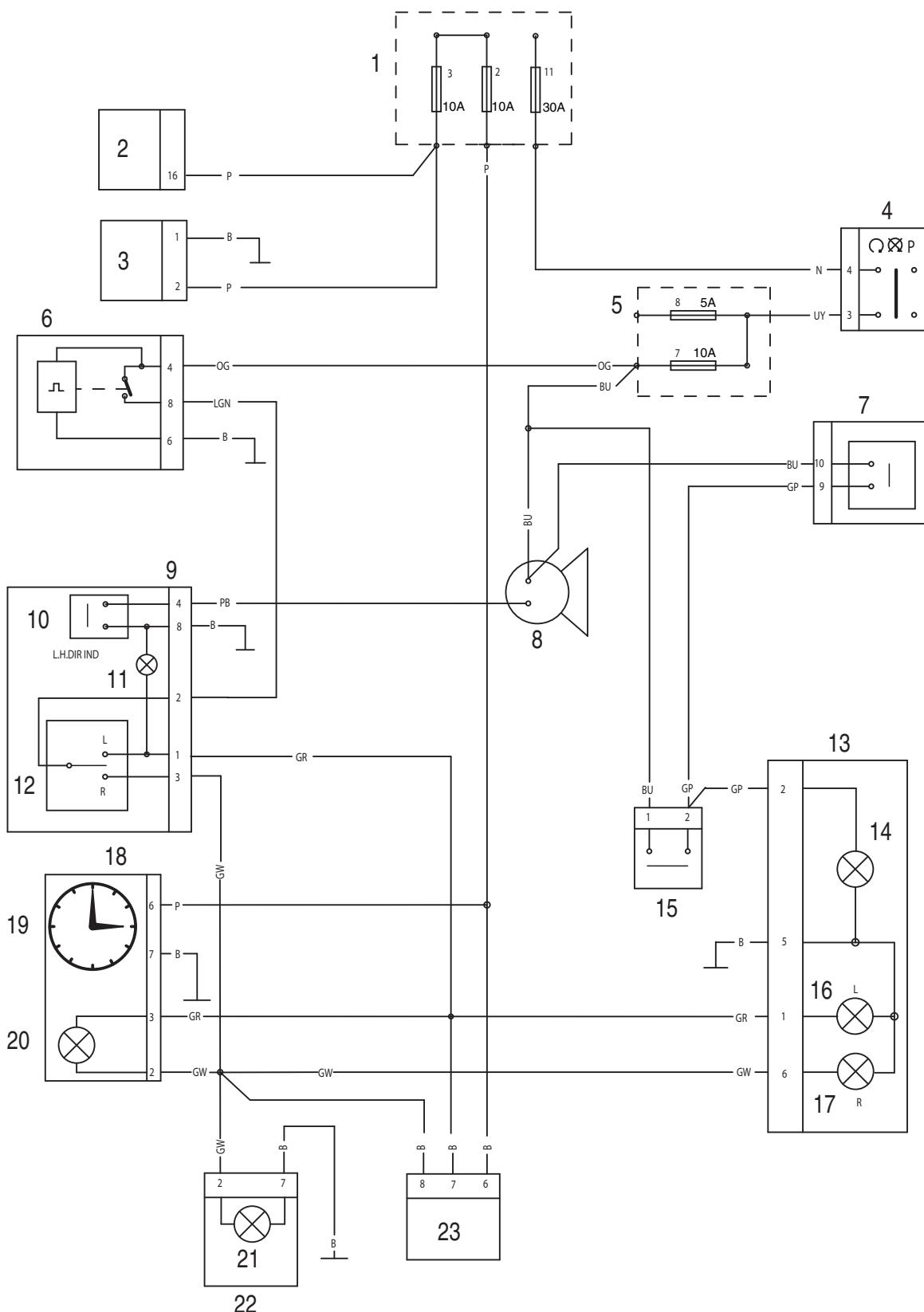
Electrical & Ignition Systems

Key to Auxiliary Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer

Item number	Description
1	Fuses 2, 3 and 4
2	Diagnostic connector
3	Accessory socket
4	Ignition switch
5	Fuse Box (fuses 7 & 8)
6	Direction indicator unit
7	Front brake lever switch
8	Horn
9	Left hand switch cube
10	Horn button
11	Left hand front indicator
12	Direction indicator switch
13	Rear light
14	Brake light
15	Rear brake lever switch
16	Left hand rear indicator
17	Right hand rear indicator
18	Instrument Assembly
19	Clock
20	Indicator warning light
21	Right hand front indicator
22	Right hand switch cube
23	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 - Fuel Injected Models - with Cable Driven Speedometer



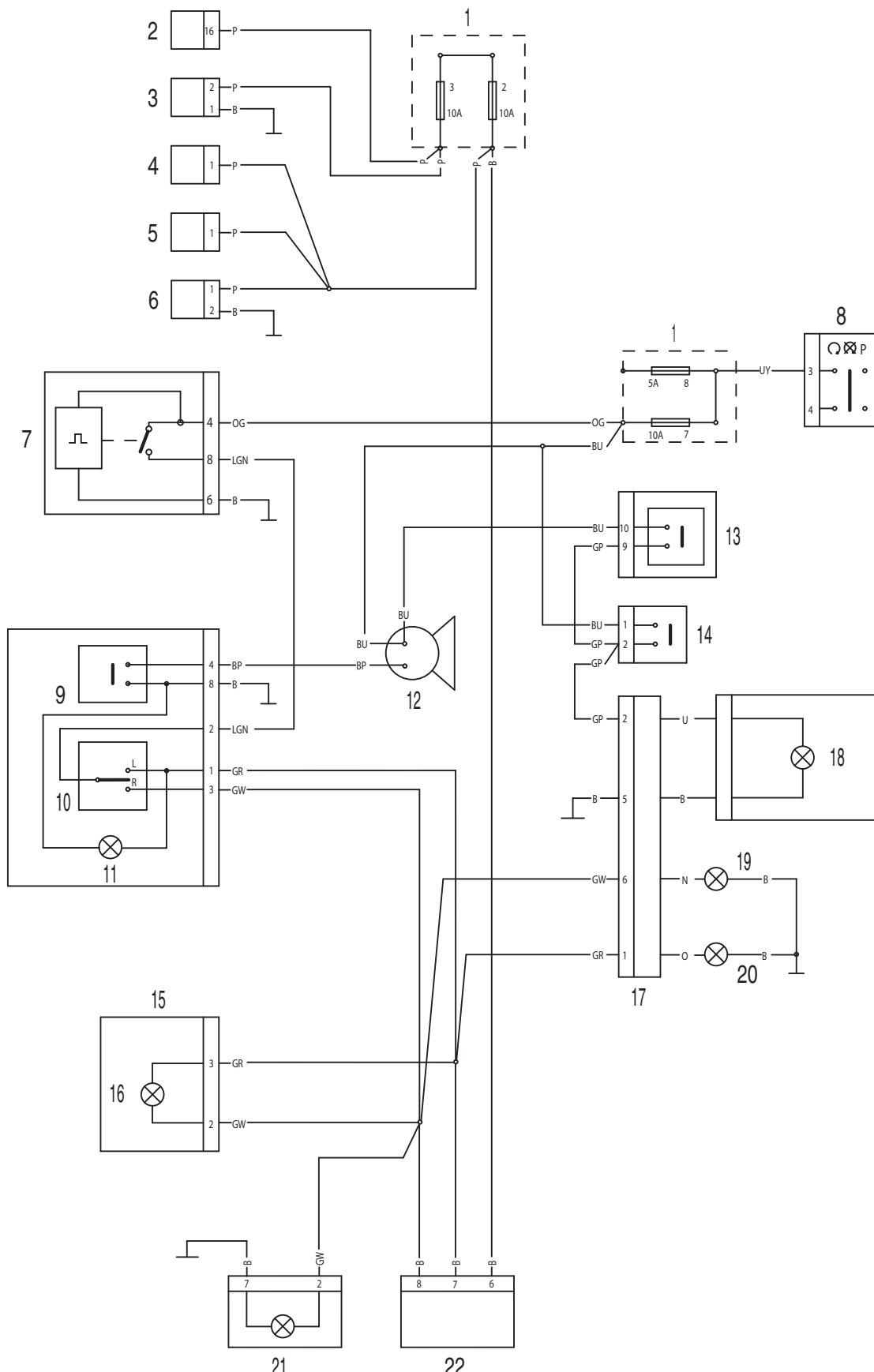
Electrical & Ignition Systems

Key to Auxiliary Circuit Diagram - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer

Item number	Description
1	Fuses 2, 3, 7 and 8
2	Diagnostic connector
3	Accessory socket
4	Speedometer
5	Tachometer (if fitted)
6	GPS connector
7	Direction indicator switch
8	Ignition switch
9	Horn button
10	Direction indicator switch
11	Left hand front indicator
12	Horn
13	Front brake lever switch
14	Rear brake lever switch
15	Console warning lights
16	Indicator warning light
17	Rear light sub-harness
18	Brake light
19	Right hand rear indicator
20	Left hand rear indicator
21	Right hand front indicator
22	Alarm 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, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer



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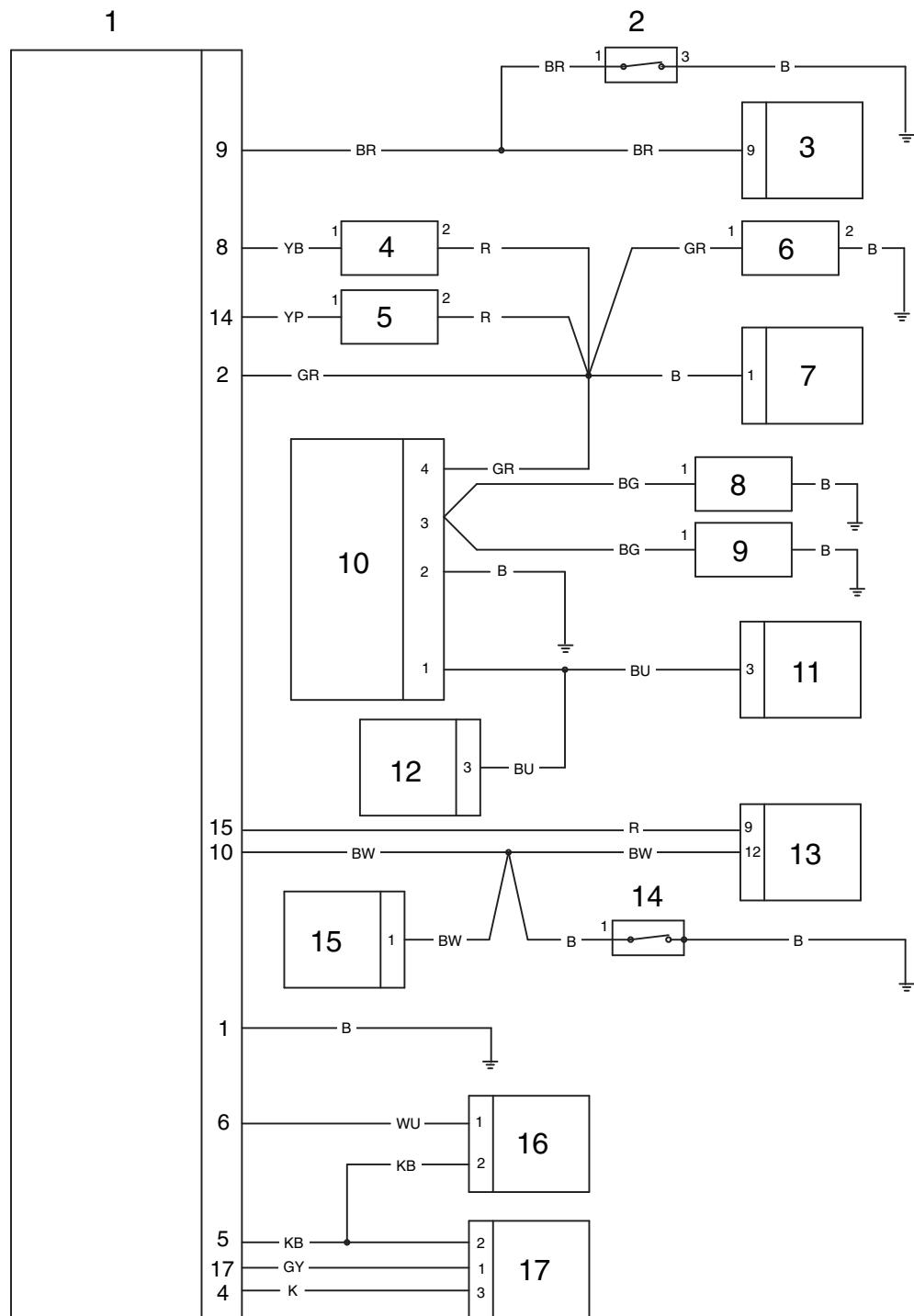
Electrical & Ignition Systems

Key to Ignition Circuit Diagram - America & Speedmaster - Carburettor Models

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 - Carburettor Models



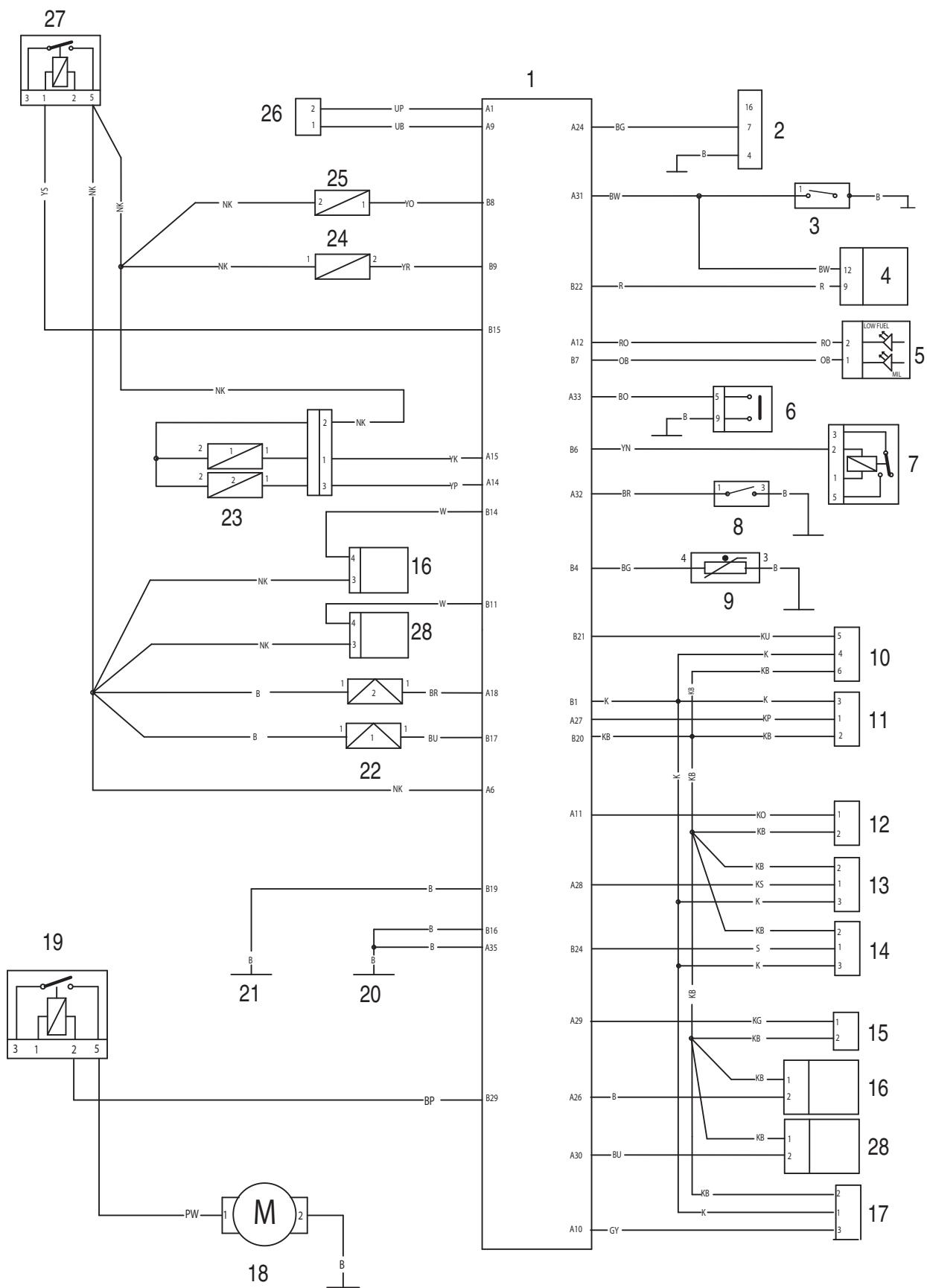
Electrical & Ignition Systems

Key to Engine Management Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer

Item number	Description
1	Engine Control Module
2	Diagnostic Connector
3	Neutral Switch
4	Instrument Assembly
5	Instrument Warning LEDs
6	Clutch Switch
7	Starter Relay
8	Sidestand Switch
9	Fuel level Sender
10	Fall Detection Switch
11	Ambient Air Temperature Sensor
12	Intake Air Temperature Sensor
13	Left hand MAP Sensor
14	Right hand MAP sensor
15	Oil Temperature Sensor
16	Oxygen Sensor - Cylinder 1
17	Throttle Position Sensor
18	Fuel Pump
19	Fuel Pump Relay
20	Power Ground
21	Logic Ground
22	Ignition Coils
23	Fuel Injectors
24	Purge Valve
25	Exhaust Air Injection Solenoid
26	Crankshaft Sensor
27	Engine Management System Relay
28	Oxygen Sensor - Cylinder 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

Engine Management Circuit - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer



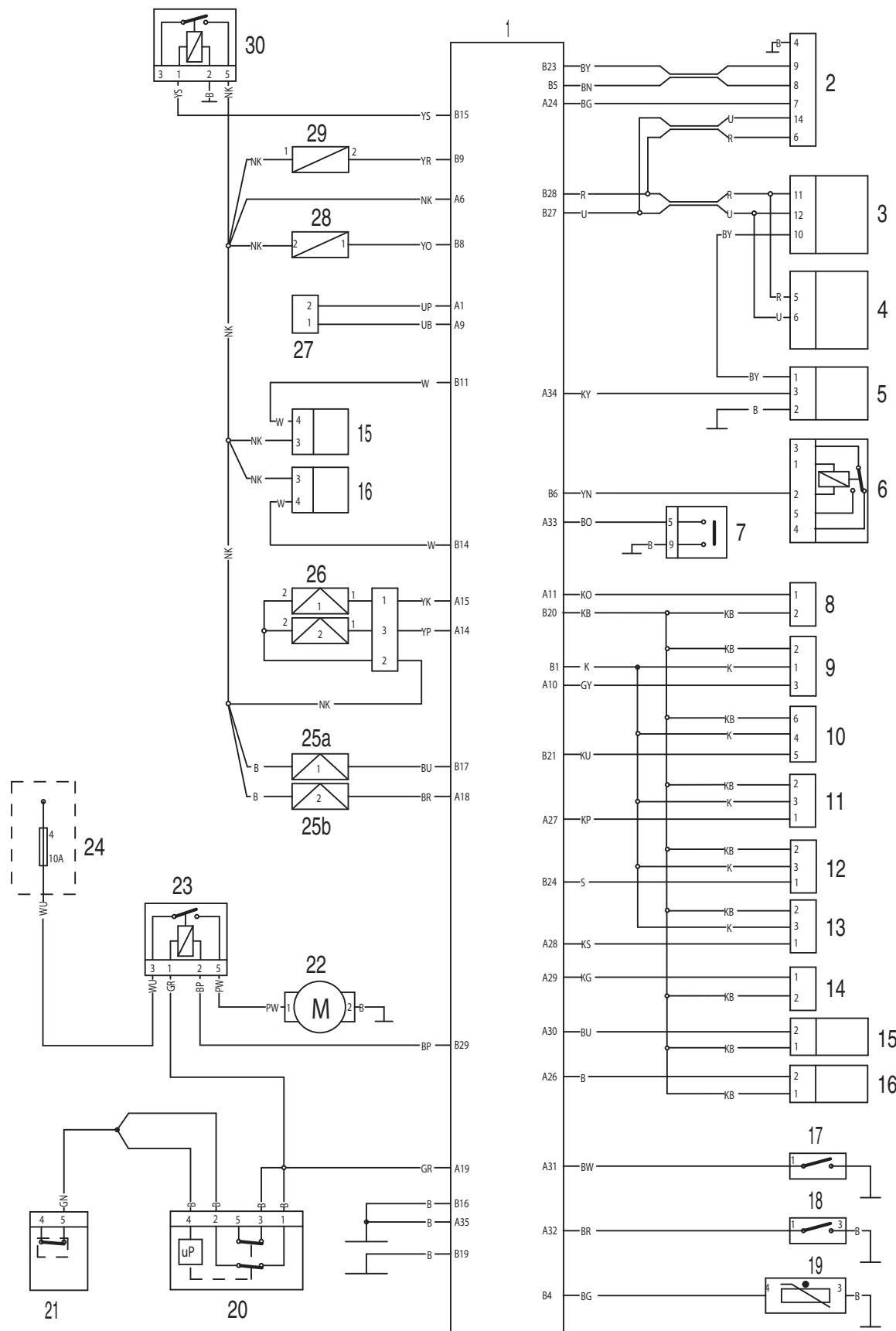
Electrical & Ignition Systems

Key to Engine Management Circuit Diagram - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer

Item number	Description
1	Engine Control Module
2	Diagnostic Connector
3	Instrument Speedometer
4	Instrument Tachometer
5	Vehicle Speed Sensor
6	Starter Relay
7	Clutch Switch
8	Intake Air Temperature Sensor
9	Throttle Position Sensor
10	Fall Detection Switch
11	Barometric Pressure Sensor
12	Right hand MAP sensor
13	Left hand MAP Sensor
14	Oil Temperature Sensor
15	Oxygen Sensor - cylinder 2
16	Oxygen Sensor - cylinder 1
17	Neutral Switch
18	Sidestand Switch
19	Fuel level Sender
20	Alarm Unit
21	Engine Stop Switch
22	Fuel Pump
23	Fuel Pump Relay
24	Fuse Box (fuse 4)
25a	Ignition Coil 1
25b	Ignition Coil 1
26	Fuel Injectors
27	Crankshaft Sensor
28	Exhaust Air Injection Solenoid
29	Purge Valve
30	Engine Management System Relay

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

Engine Management Circuit - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer



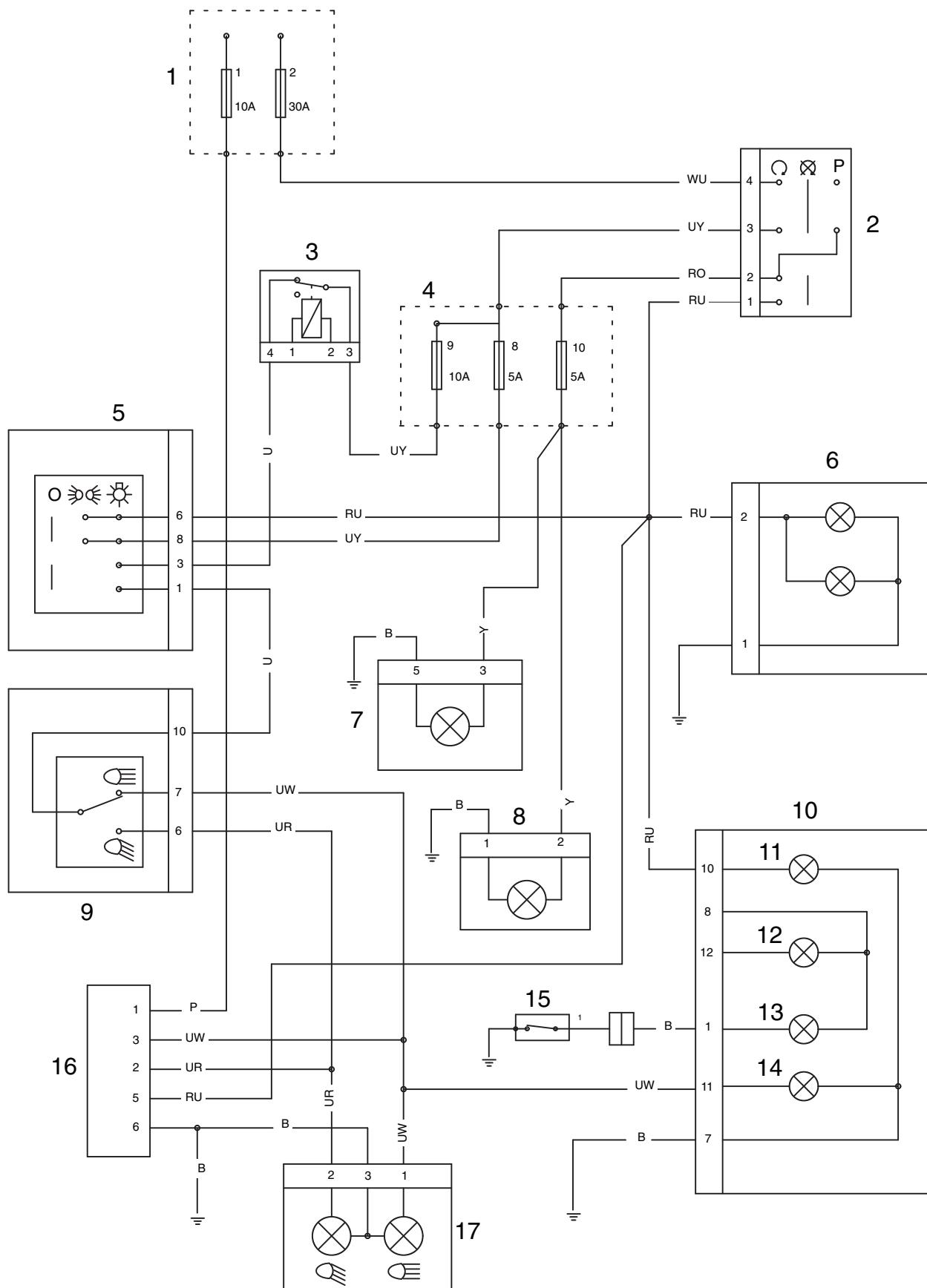
Electrical & Ignition Systems

Key to Lighting Circuit Diagram - America & Speedmaster (fitted with headlight switch) - Carburettor Models

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 (Speedmaster)
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) - Carburettor Models



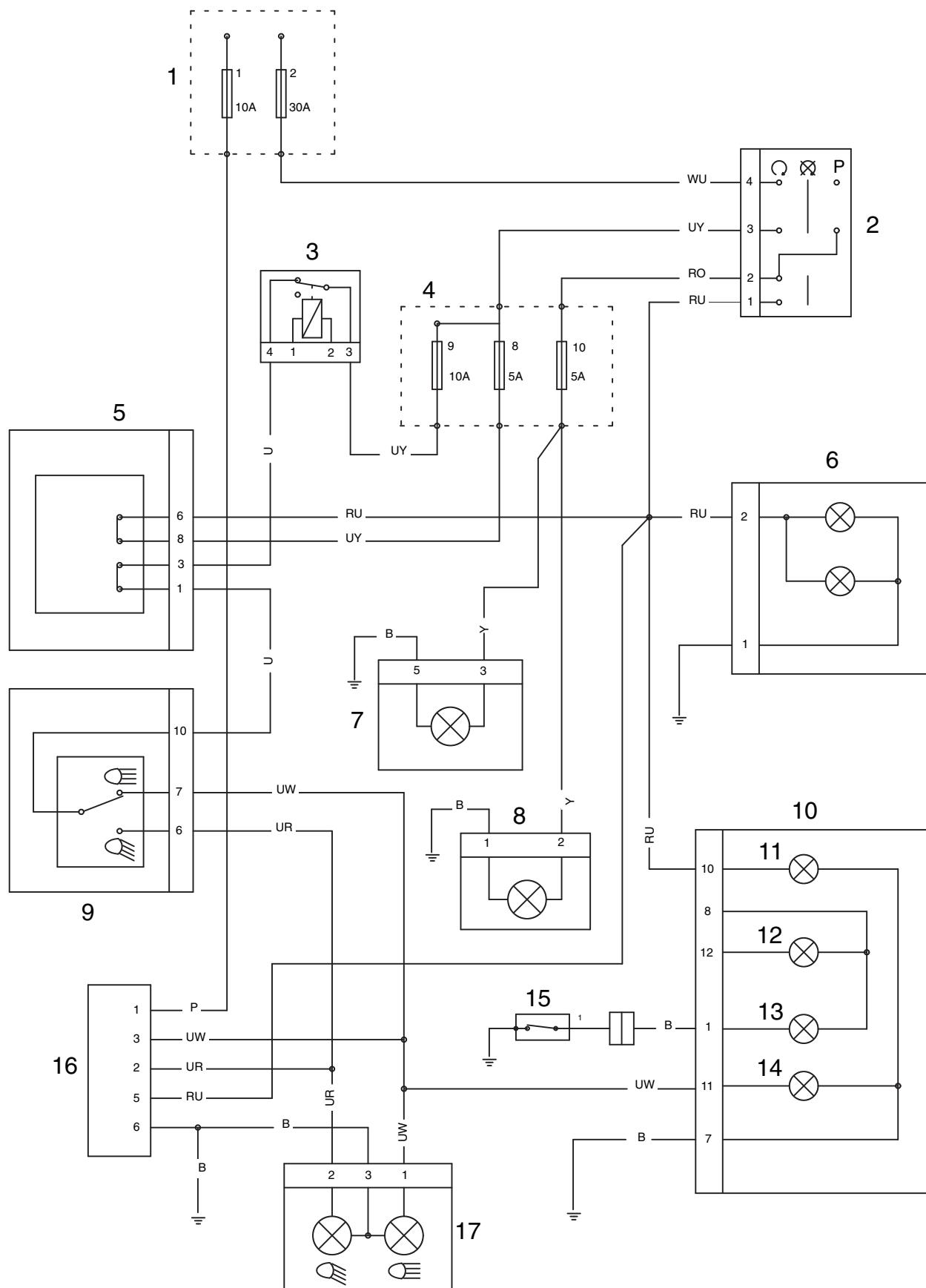
Electrical & Ignition Systems

Key to Lighting Circuit Diagram - America & Speedmaster (headlights on) - Carburettor Models

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 (Speedmaster)
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) - Carburettor Models



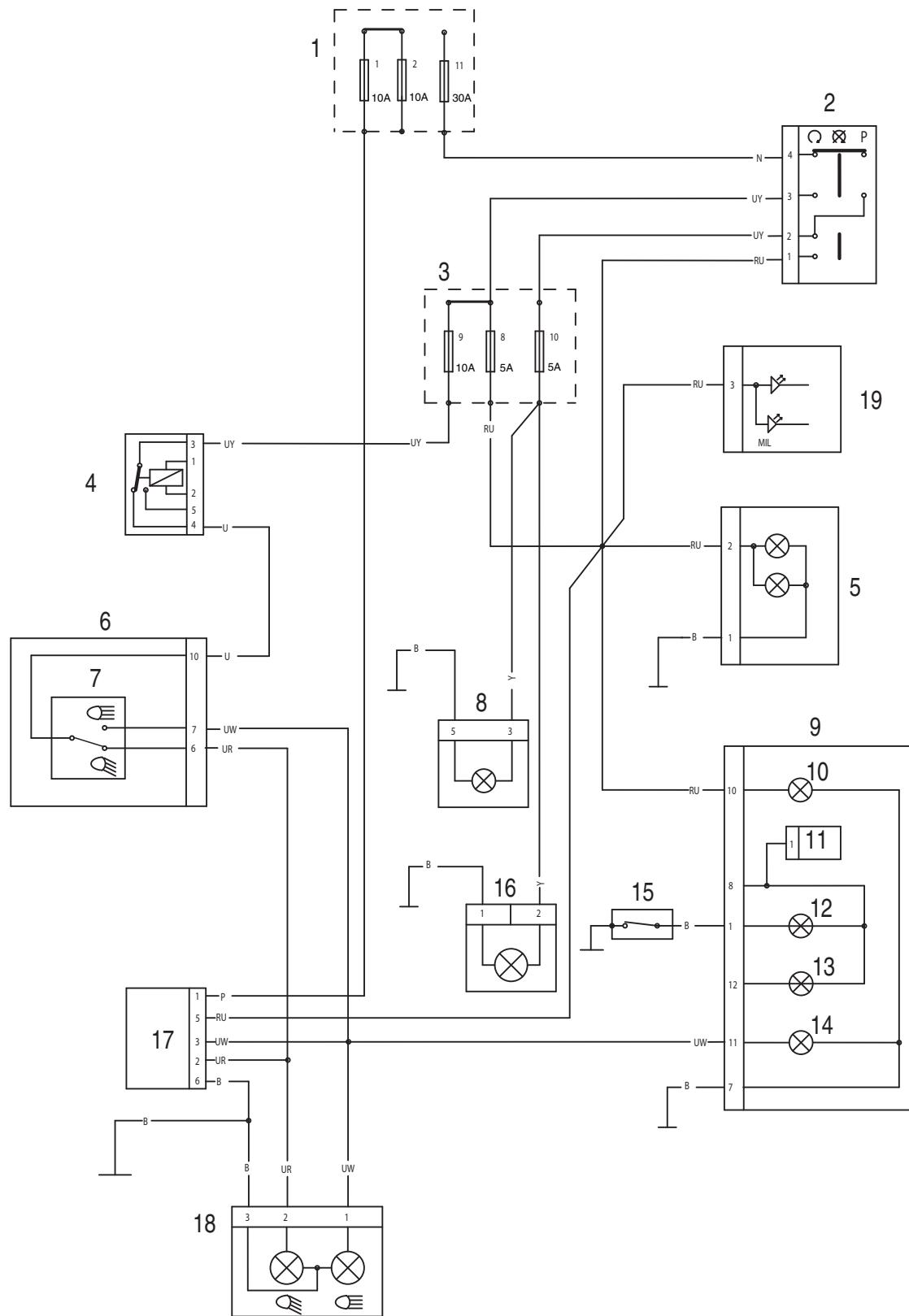
Electrical & Ignition Systems

Key to Lighting Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer

Item number	Description
1	Fuses 1, 2 & 11
2	Ignition switch
3	Fuses 8, 9 & 10
4	Starter relay
5	Speedometer illumination
6	Left hand switch cube
7	Headlight dip-switch
8	Rear light
9	Instrument assembly
10	Clock illumination (accessory) or tachometer illumination (Speedmaster)
11	Tachometer
12	Oil pressure warning light
13	Neutral warning light
14	Main beam warning light
15	Oil pressure switch
16	Front position light
17	Accessory Lighting Connector
18	Headlight
19	Instruments (LED warning lights)

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 - Fuel Injected Models - with Cable Driven Speedometer



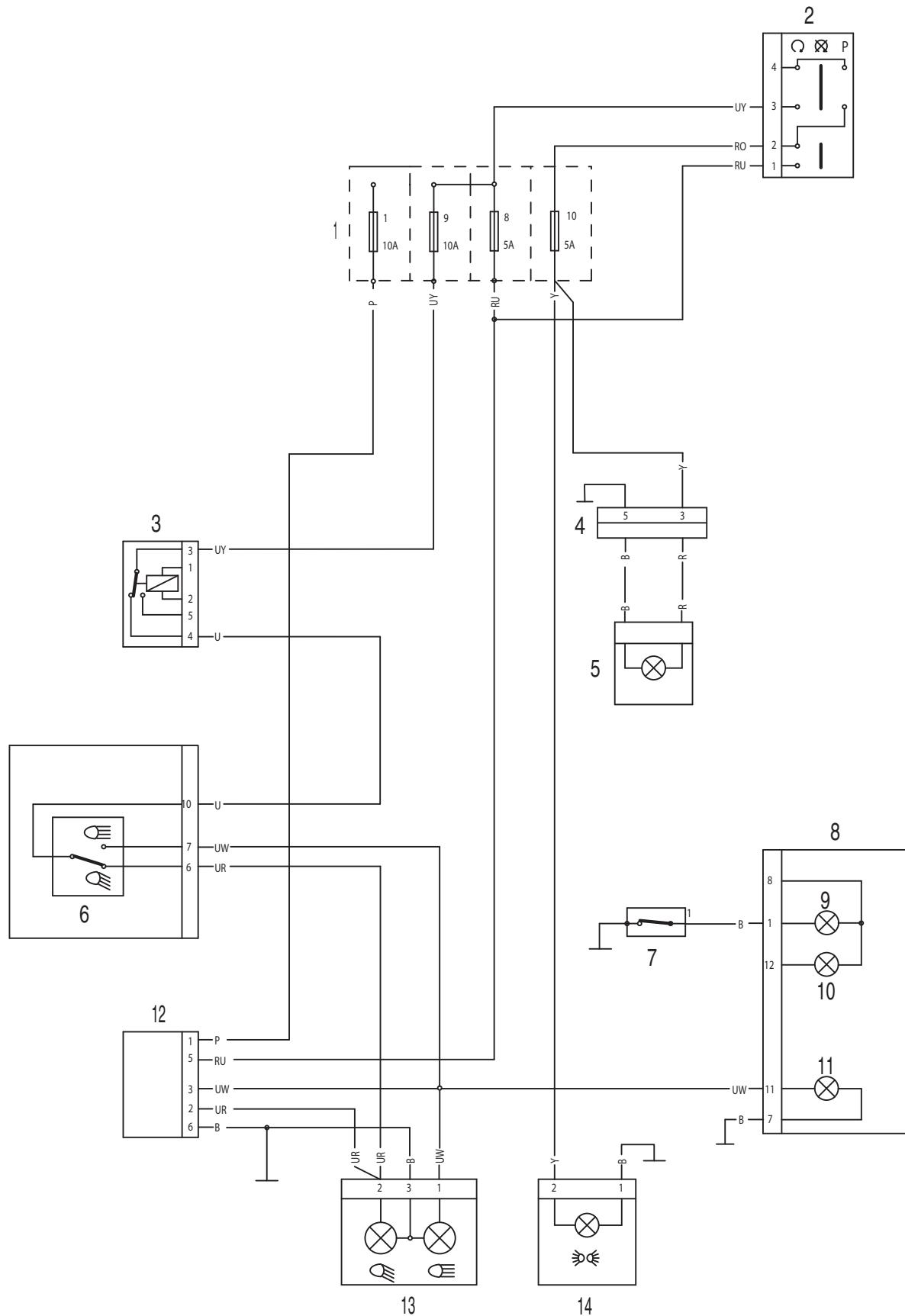
Electrical & Ignition Systems

Key to Lighting Circuit Diagram - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer

Item number	Description
1	Fuses 1, 8, 9 & 10
2	Ignition switch
3	Starter relay
4	Rear light sub-harness
5	Rear light
6	Headlight dip/main switch
7	Oil pressure switch
8	Console warning lights
9	Oil pressure warning light
10	Neutral warning light
11	Main beam warning light
12	Accessory lighting connector
13	Headlight dip/main
14	Front position 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

Lighting Circuit - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer



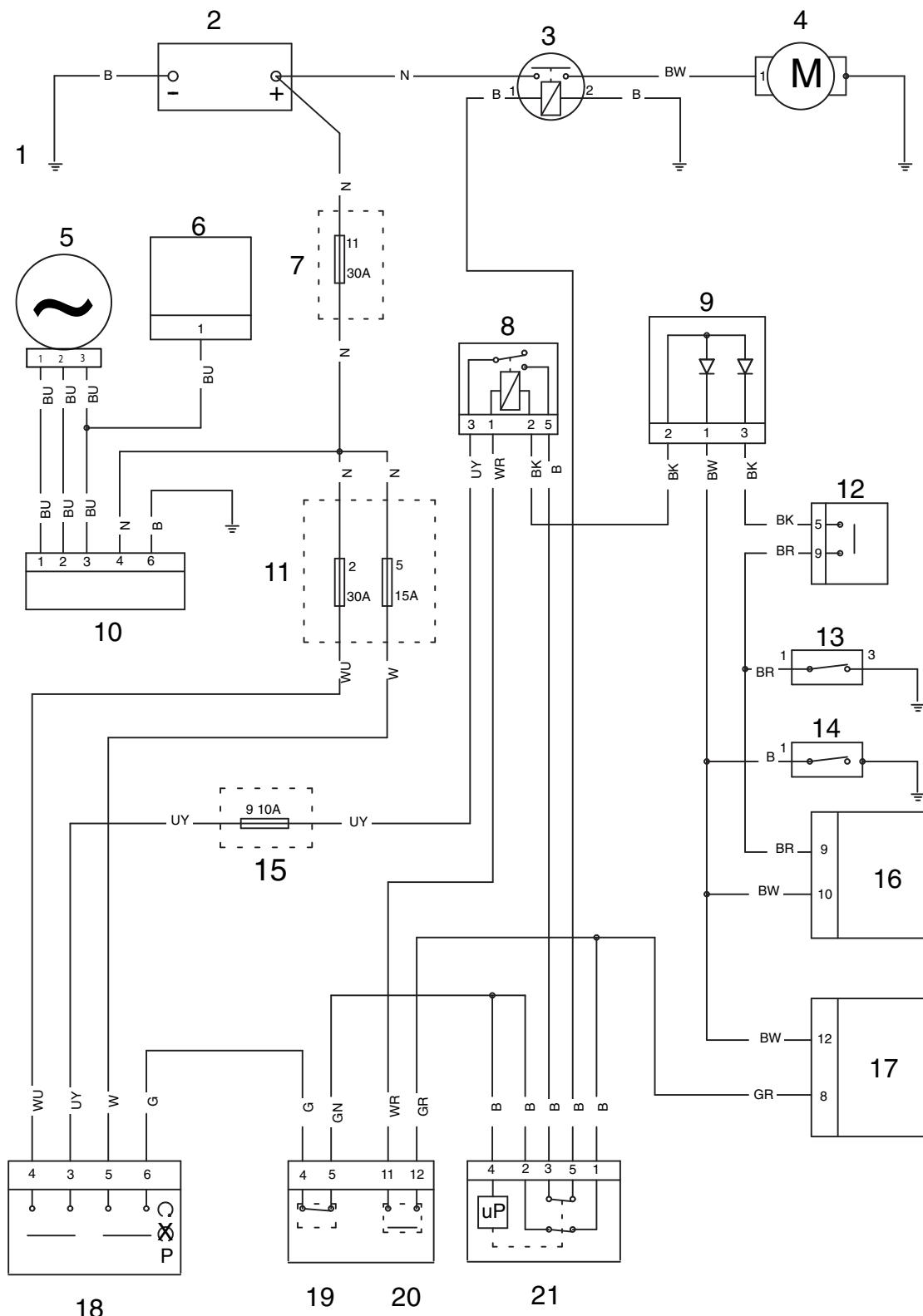
Electrical & Ignition Systems

Key to Starting/charging Circuit Diagram - America & Speedmaster - Carburettor Models

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 stop 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 Circuit - America & Speedmaster - Carburettor Models



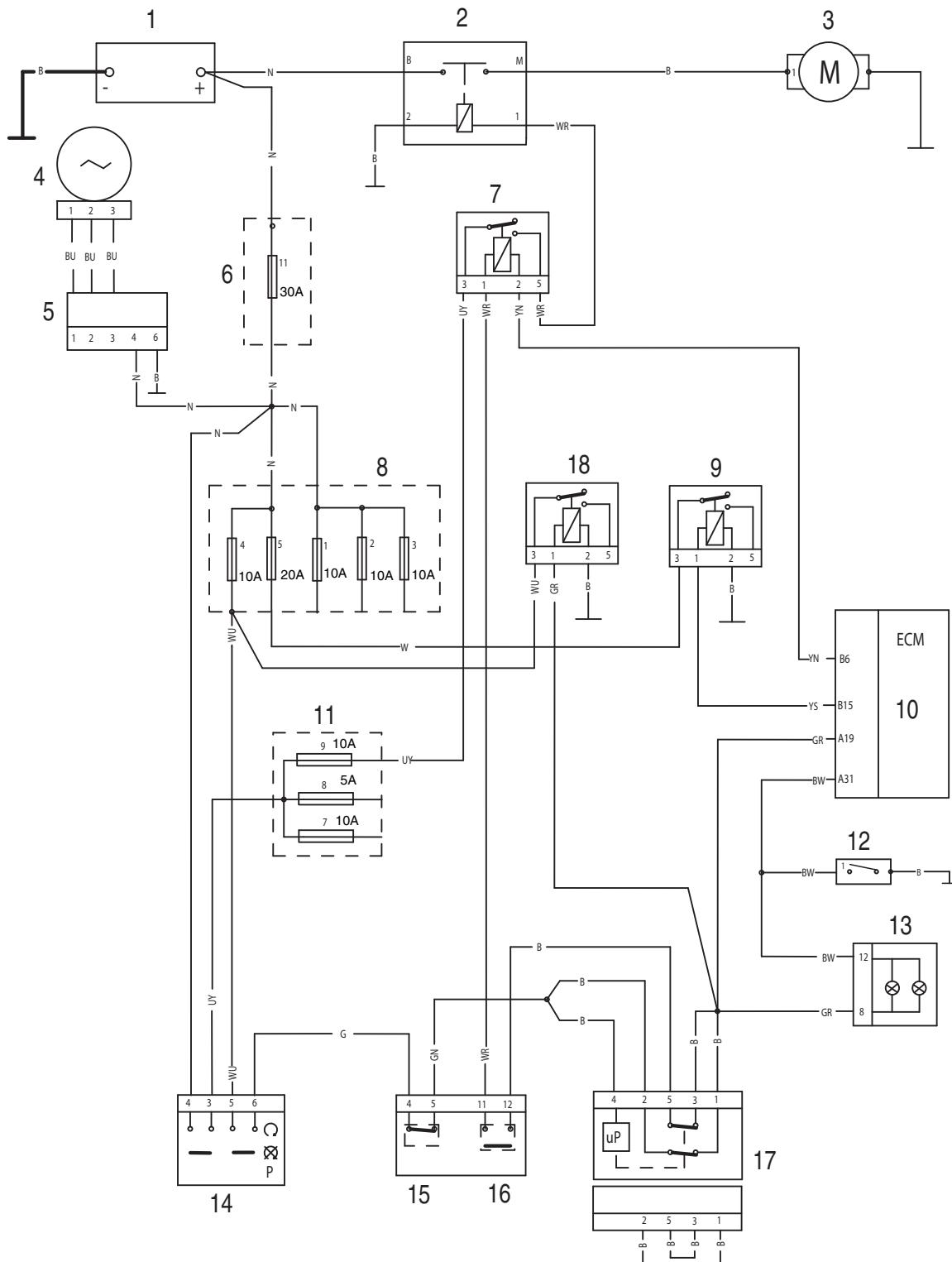
Electrical & Ignition Systems

Key to Starting/charging Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer

Item number	Description
1	Battery
2	Starter solenoid
3	Starter motor
4	Alternator
5	Rectifier regulator
6	Fuse box (fuse 11)
7	Starter relay
8	Fuses 1, 2, 3, 4 and 5
9	Engine Control Module Relay
10	Engine Control Module
11	Fuse Box (Fuses 7, 8 & 9)
12	Neutral switch
13	Instrument assembly
14	Ignition switch
15	Engine stop switch
16	Starter button
17	Alarm control unit
18	Fuel pump relay

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 Circuit - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer



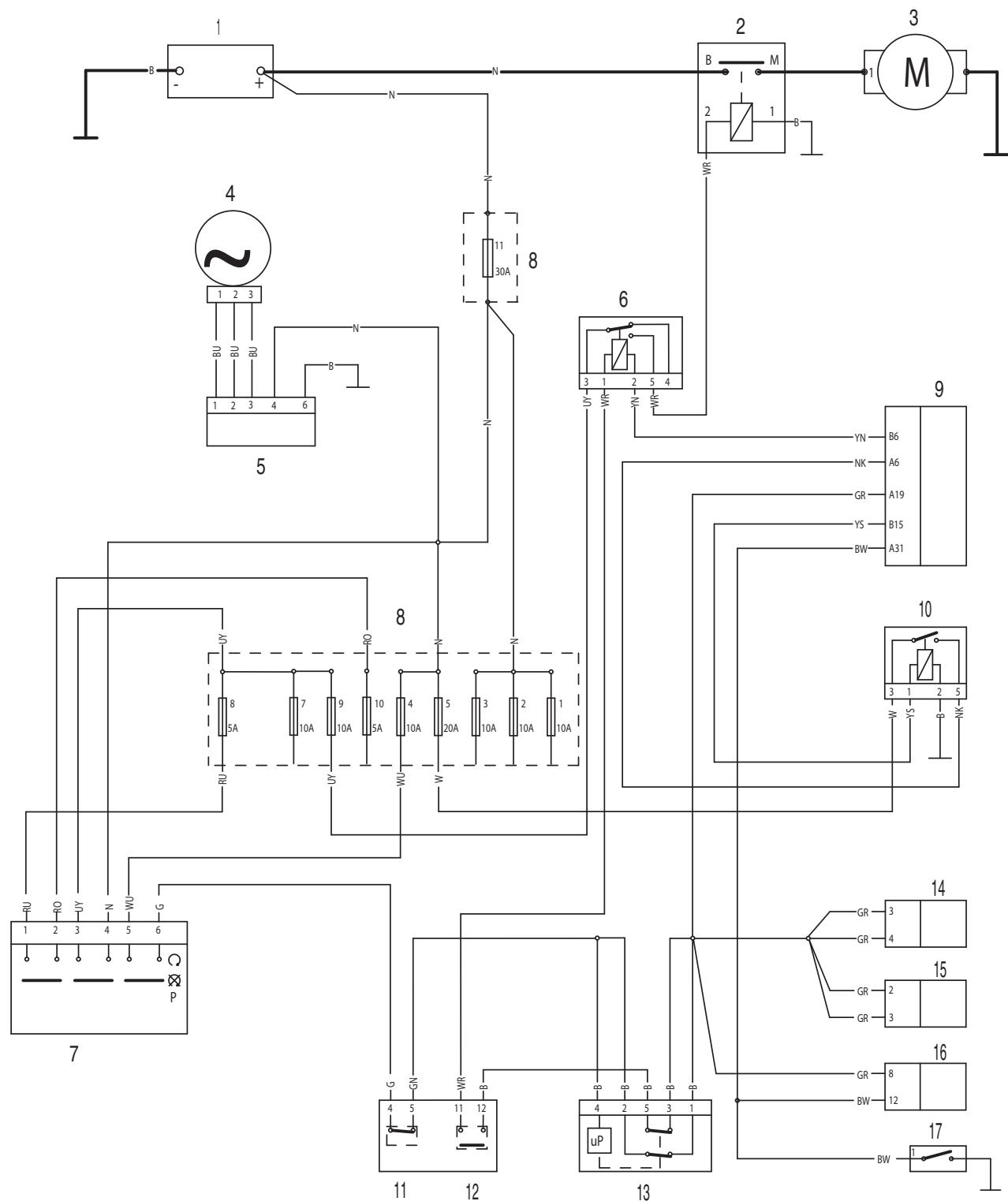
Electrical & Ignition Systems

Key to Starting/charging Circuit Diagram - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer

Item number	Description
1	Battery
2	Starter solenoid
3	Starter motor
4	Alternator
5	Rectifier regulator
6	Starter relay
7	Ignition switch
8	Fuse box (fuse 11)
9	Engine Control Module
10	Engine management relay
11	Engine stop switch
12	Starter button
13	Alarm control unit
14	Speedometer
15	Tachometer (if fitted)
16	Console warning lights
17	Neutral 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

Starting/Charging Circuit - America, America LT & Speedmaster - Fuel Injected Models - with Electronic Speedometer



Electrical & Ignition Systems

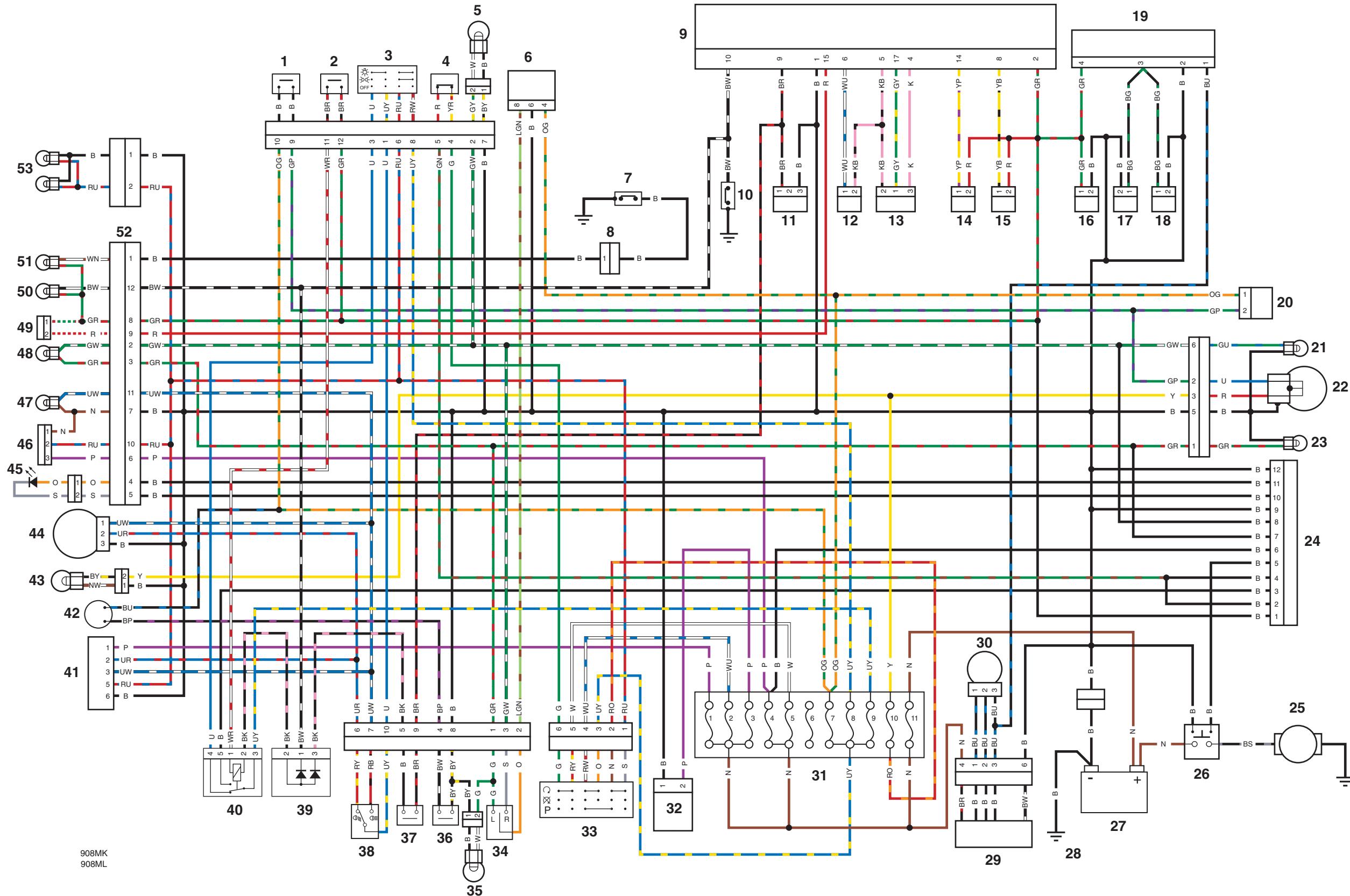
Key to Main Circuit Diagram - America & Speedmaster - Carburettor Models

Item Number	Description
1	Front brake lever switch
2	Starter button
3	Main lighting switch
4	Engine stop 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
36	Horn button

Item Number	Description
37	Clutch switch
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

Main Circuit Diagram - America & Speedmaster - Carburettor Models



Electrical & Ignition Systems

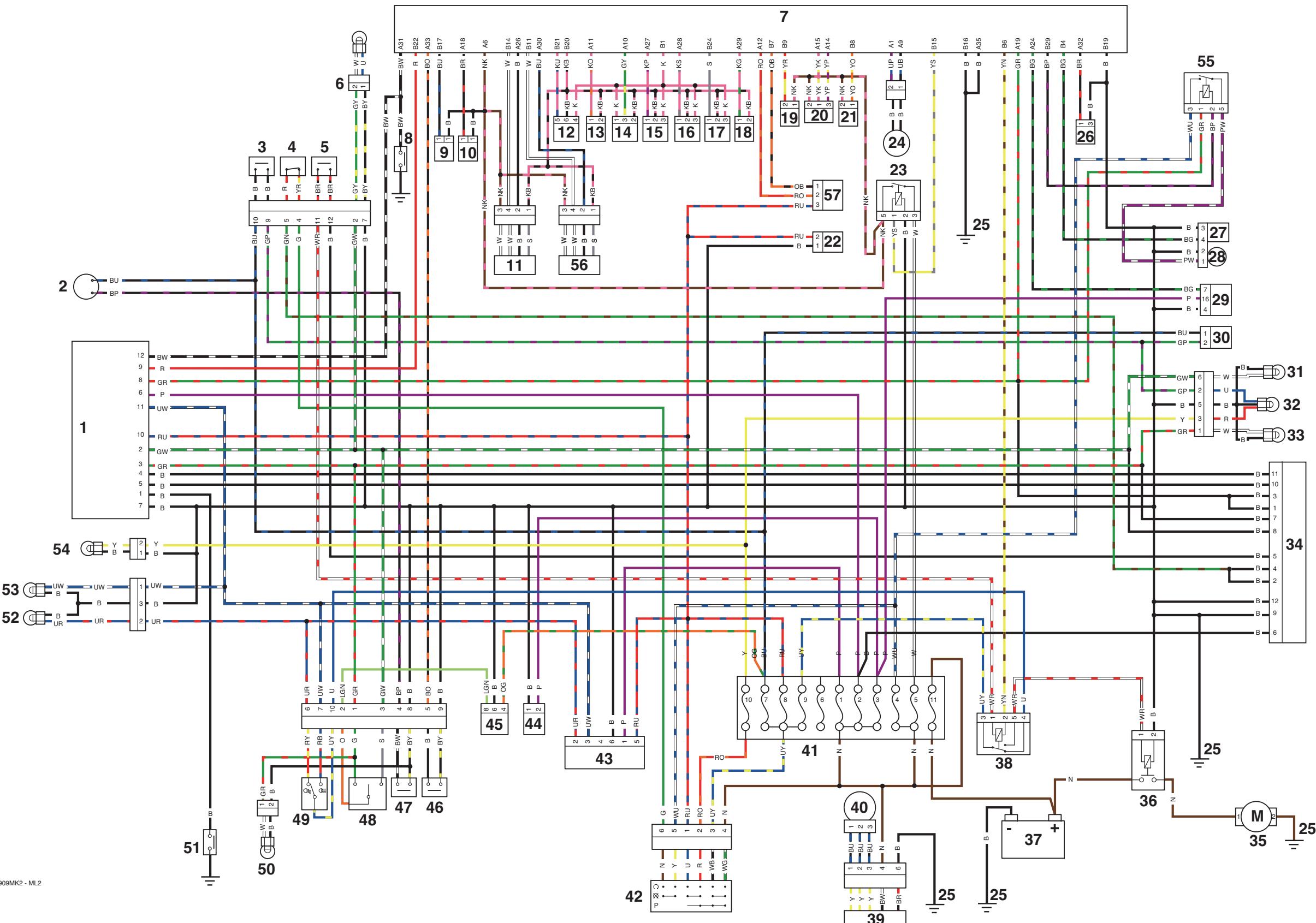
Key to Main Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer

Item Number	Description
1	Instrument assembly
2	Horn
3	Front brake lever switch
4	Engine stop switch
5	Starter button
6	Right hand front indicator
7	Engine control module
8	Neutral switch
9	Ignition coil number 1
10	Ignition coil number 2 (Scrambler only)
11	Oxygen sensor (cylinder 1)
12	Fall detection switch
13	Inlet air temperature sensor
14	Throttle position sensor
15	Ambient pressure sensor
16	MAP sensor left hand
17	MAP sensor right hand
18	Oil temp sensor
19	Purge valve
20	Fuel Injectors 1 & 2
21	Exhaust air injection solenoid
22	Speedometer
23	Engine management relay
24	Crankshaft position sensor
25	Engine earth
26	Sidestand switch
27	Fuel level sender
28	Fuel pump
29	Diagnostic connector
30	Rear brake pedal switch
31	Right hand rear indicator
32	Rear light
33	Left hand rear indicator
34	Alarm connector
35	Starter motor
36	Starter solenoid

Item Number	Description
37	Battery
38	Starter relay
39	Diode pack
40	Starter relay
41	Fuse box
42	Ignition switch
43	Accessory lights connector
44	Accessory socket
45	Direction indicator control unit
46	Clutch switch
47	Horn button
48	Direction indicator switch
49	Headlight dip switch
50	Left hand front indicator
51	Oil pressure switch
52	Headlight dip
53	Headlight main
54	Position light
55	Fuel pump relay
56	Oxygen sensor (cylinder 2)
57	Instrument warning LEDs (Low fuel & MIL)

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

Main Circuit Diagram - America & Speedmaster - Fuel Injected Models - with Cable Driven Speedometer



Electrical & Ignition Systems

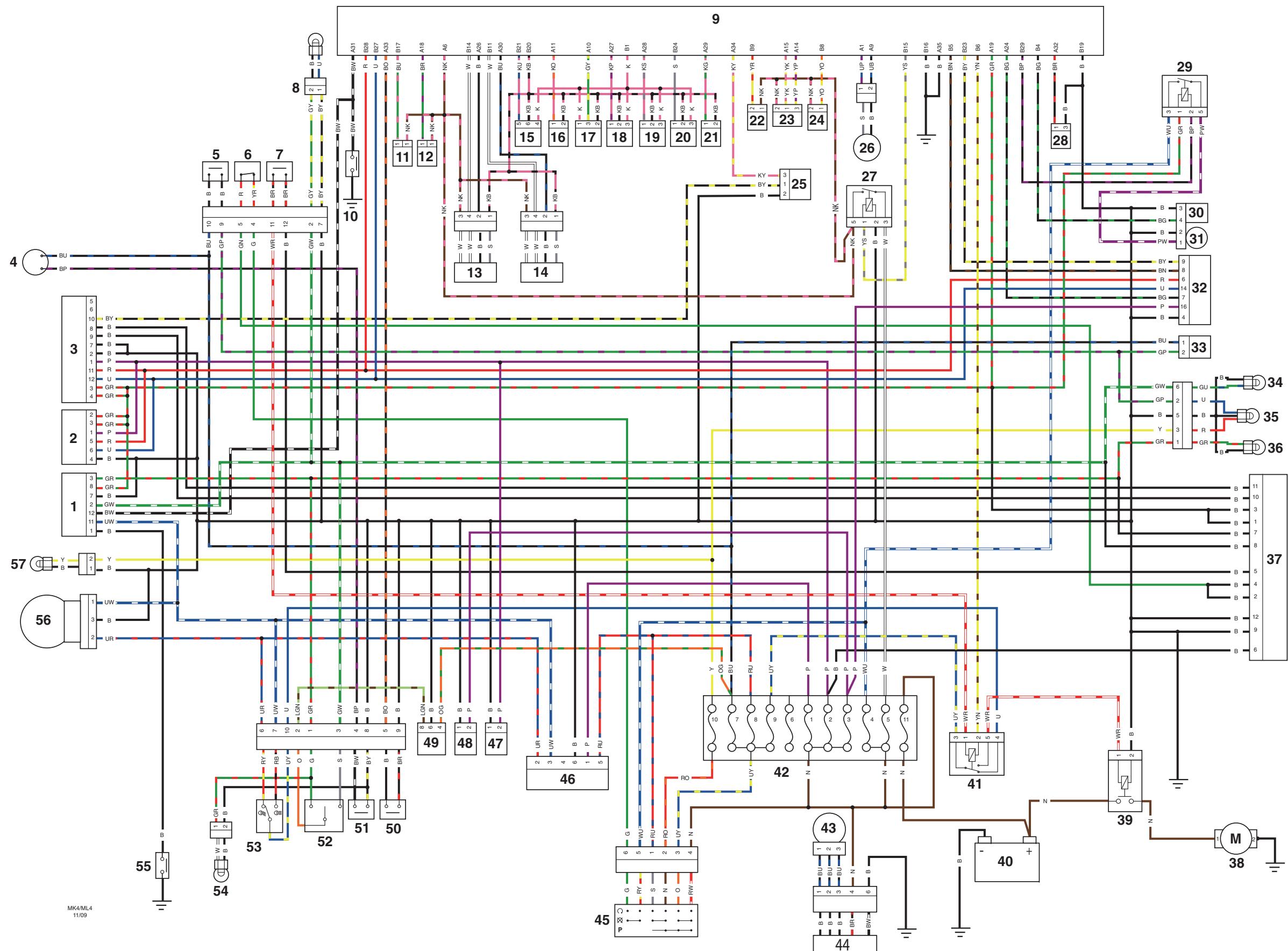
Key to Main Circuit Diagram - America up to VIN 468389 & Speedmaster up to VIN 469049 - Fuel Injected Models - with Electronic Speedometer

Item Number	Description
1	Console warning lights
2	Tachometer (if fitted)
3	Speedometer
4	Horn
5	Front brake lever switch
6	Engine stop switch
7	Starter button
8	Right hand front indicator
9	Engine control module
10	Neutral switch
11	Ignition coil number 1
12	Ignition coil number 2
13	Oxygen sensor (cylinder 1)
14	Oxygen sensor (cylinder 2)
15	Fall detection switch
16	Inlet air temperature sensor
17	Throttle position sensor
18	Ambient pressure sensor
19	MAP sensor left hand
20	MAP sensor right hand
21	Oil temp sensor
22	Purge valve
23	Fuel Injectors 1 & 2
24	Exhaust air injection solenoid
25	Vehicle speed sensor
26	Crankshaft position sensor
27	Engine management relay
28	Sidestand switch
29	Fuel pump relay
30	Fuel level sender
31	Fuel pump
32	Diagnostic connector
33	Rear brake pedal switch
34	Right hand rear indicator
35	Rear light
36	Left hand rear indicator

Item Number	Description
37	Alarm unit
38	Starter motor
39	Starter solenoid
40	Battery
41	Starter relay
42	Fuse box
43	Alternator
44	Rectifier/regulator
45	Ignition switch
46	Accessory lights connector
47	GPS Socket
48	Accessory socket
49	Direction indicator control unit
50	Clutch switch
51	Horn button
52	Direction indicator switch
53	Headlight dip/main switch
54	Left hand front indicator
55	Oil pressure switch
56	Headlight dip/main
57	Position 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

Main Circuit Diagram - America up to VIN 468389 & Speedmaster up to VIN 469049 - Fuel Injected Models - with Electronic Speedometer



Electrical & Ignition Systems

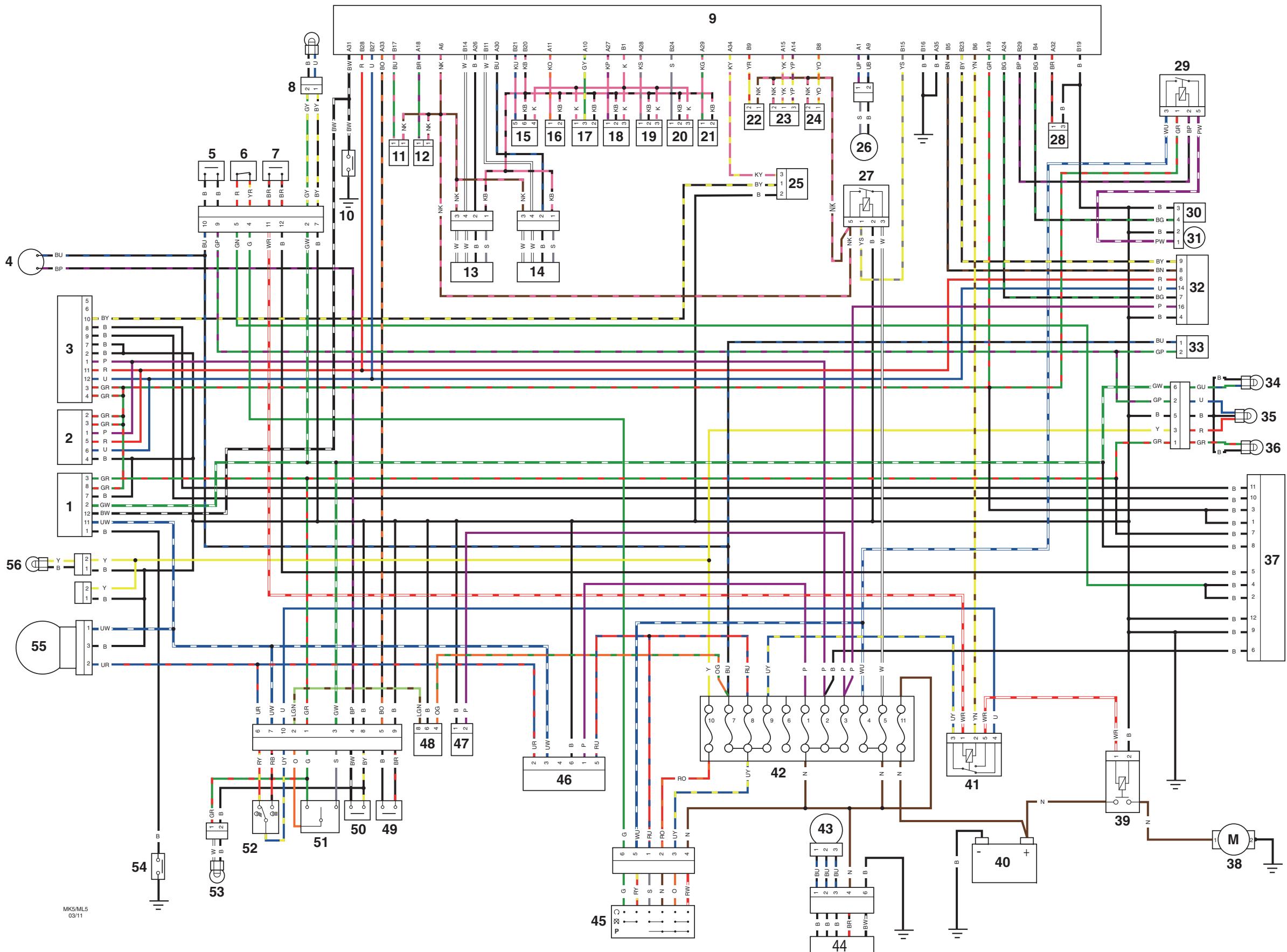
Key to Main Circuit Diagram - America & America LT from VIN 468390 & Speedmaster from VIN 469050

Item Number	Description
1	Console warning lights
2	Tachometer (if fitted)
3	Speedometer
4	Horn
5	Front brake lever switch
6	Engine stop switch
7	Starter button
8	Right hand front indicator
9	Engine control module
10	Neutral switch
11	Ignition coil number 1
12	Ignition coil number 2
13	Oxygen sensor (cylinder 1)
14	Oxygen sensor (cylinder 2)
15	Fall detection switch
16	Inlet air temperature sensor
17	Throttle position sensor
18	Ambient pressure sensor
19	MAP sensor left hand
20	MAP sensor right hand
21	Oil temp sensor
22	Purge valve
23	Fuel Injectors 1 & 2
24	Exhaust air injection solenoid
25	Vehicle speed sensor
26	Crankshaft position sensor
27	Engine management relay
28	Sidestand switch
29	Fuel pump relay
30	Fuel level sender
31	Fuel pump
32	Diagnostic connector
33	Rear brake pedal switch
34	Right hand rear indicator
35	Rear light
36	Left hand rear indicator

Item Number	Description
37	Alarm unit
38	Starter motor
39	Starter solenoid
40	Battery
41	Starter relay
42	Fuse box
43	Alternator
44	Rectifier/regulator
45	Ignition switch
46	Accessory lights connector
47	Accessory socket
48	Direction indicator control unit
49	Clutch switch
50	Horn button
51	Direction indicator switch
52	Headlight dip/main switch
53	Left hand front indicator
54	Oil pressure switch
55	Headlight dip/main
56	Position 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

Main Circuit Diagram - America and America LT from VIN 468390 & Speedmaster from VIN 469050



Electrical & Ignition Systems

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