TRIUMPH

DAYTONA 675

SERVICE MANUAL

INSPEKTIONSHANDBUCH

MANUEL D'ENTRETIEN

MANUALE DI MANUTENZIONE

モーターサイクル整備説明書

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Introduction

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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 parts catalogue/parts microfiche.**
- **Follow the procedures in this manual carefully and completely. Do not take short cuts.**
- **Keep complete records of all maintenance and repairs with dates and any new parts installed.**
- **Use only approved lubricants, as specified in the owner's handbook, in the maintenance of the motorcycle.**

How to use this manual

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

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

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

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

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

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

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 procedure

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

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

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

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

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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!

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 and bevel box oils may be hot to the touch. Contact with hot oil may cause the skin to be scalded or burned.

Warning

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

Health Protection Precautions

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Overalls must be cleaned regularly. Discard heavily soiled clothing and oil impregnated footwear.
- First aid treatment should be obtained immediately for open cuts and wounds. Always be aware of who your nearest first-

aider is and where the medical facilities are kept.

- Use barrier creams, applying before each work period to protect the skin from the effects of oil and grease and to aid removal of the same after completing work.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use petrol, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practicable, de-grease components prior to handling.

Warning

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

Environmental Protection Precautions

Caution

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

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

Dispose of used oil and used filters through authorised waste disposal contractors, to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact 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 D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

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

⚠ Warning

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

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

Safety Instructions

Jacking and Lifting

⚠ Warning

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

Coolant

⚠ Warning

Coolant mixture, which is blended with anti-freeze and corrosion inhibitors contains toxic chemicals which are harmful to the human body. Never swallow anti-freeze, corrosion inhibitors or any of the motorcycle coolant.

⚠ Warning

Do not remove the radiator cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

⚠ Caution

The coolant anti-freeze contains a corrosion inhibitor which helps prevent damage to the metal surfaces inside the cooling system. Without this inhibitor, the coolant would 'attack' the metals and the resulting corrosion would cause blockages in the cooling system leading to engine overheating and damage. Always use the correct anti-freeze as specified in the Owner's Handbook. Never use a methanol based anti-freeze as this does not contain the required corrosion inhibition properties.

⚠ Caution

Distilled water must be used with the anti-freeze (see specification for anti-freeze) in the cooling system.

If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system. Reduced cooling system efficiency may lead to the engine overheating and engine 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.

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 re-assembly. 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 re-assembly, 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 Bolts

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 Bearings

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.

Warning

No one should be permitted to repair components associated with petrol/gasoline without first having specialist training on the fire hazards which may be created by incorrect installation and repair of items associated with petrol/gasoline.

Repairs carried out by untrained personnel could bring about a safety hazard leading to a risk of personal injury.

Warning

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

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

When petrol/gasoline has been extracted or drained from a fuel tank, the precautions governing naked lights and ignition sources should be maintained.

Failure to observe any of the above warnings could bring about a safety hazard leading to a risk of personal injury.

Fuel Tank Removal

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

Chassis Repairs

Warning

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

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

Electrical Precautions

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

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

Warning

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

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

Warning

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

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

Warning

The battery contains harmful materials. Always keep children away from the battery whether or not it is fitted in the motorcycle.

Do not jump start the battery, touch the battery cables together or reverse the polarity of the cables as any of these actions may cause a spark which would ignite battery gasses causing a risk of personal injury.

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

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

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

Battery Disconnecting

Before disconnecting the battery, switch off all electrical equipment.

Warning

To prevent the risk of a battery exploding and to prevent damage to electrical components ALWAYS disconnect the battery negative (black) lead first. When reconnecting the battery, always connect the positive (red) lead first, then the negative (black) lead. Always disconnect the battery when working on any part of the electrical system.

Failure to observe the above warnings may lead to electrical damage and a fire hazard which could cause personal injury.

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

Disciplines

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

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

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

Electrical Wires

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

Inspection

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

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

Replacement Parts

Warning

Only Triumph 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.

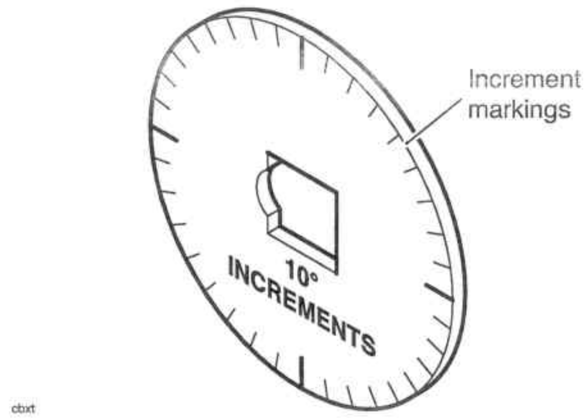
Authorised Triumph dealers are not agents of Triumph and have no authority to bind the manufacturer by any expressed or implied undertaking or representation.

Service Tools and Garage Equipment

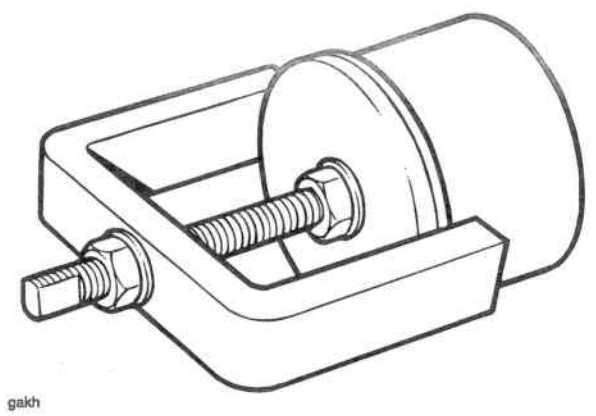
Special service tools have been developed to facilitate removal, dismantling and assembly of certain mechanical components in a practical manner without causing damage. Some operations in this Service Manual cannot be carried out without the aid of the relevant service tools. Where this is the case,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

Special Service Tools

T3880105 – Angular Torque Gauge

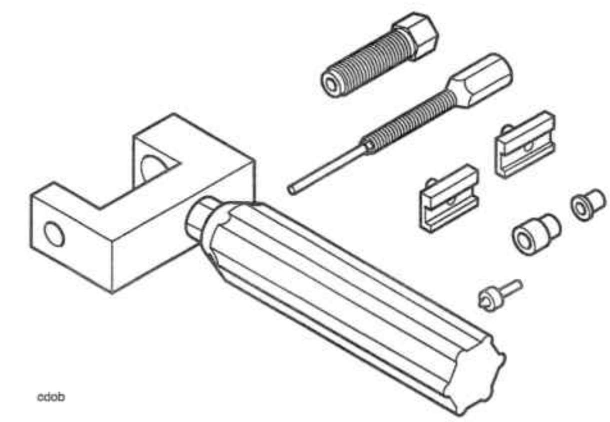


T3880315 – Extractor, Cylinder Liner (use with adaptor T3880101)

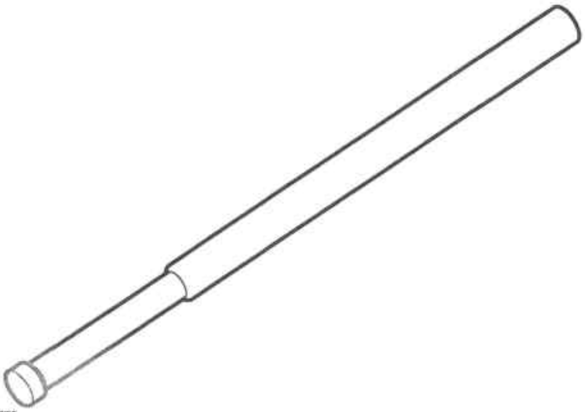


T3880250 – Engine Management Diagnostics

T3880027 – Chain Link Took Kit

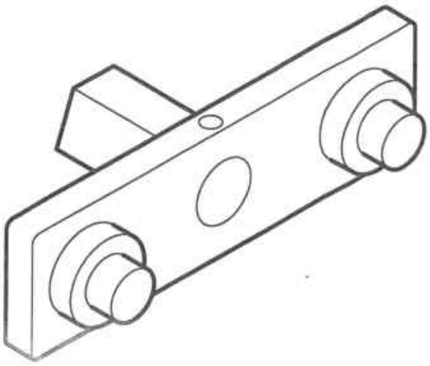


3880085-T0301 – Fork Piston Holder



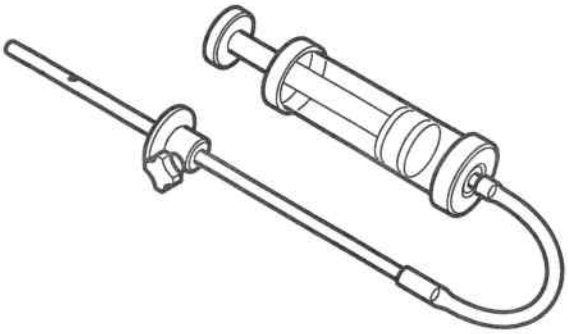
ccgs

T3880102 – Wrench, CamTurning



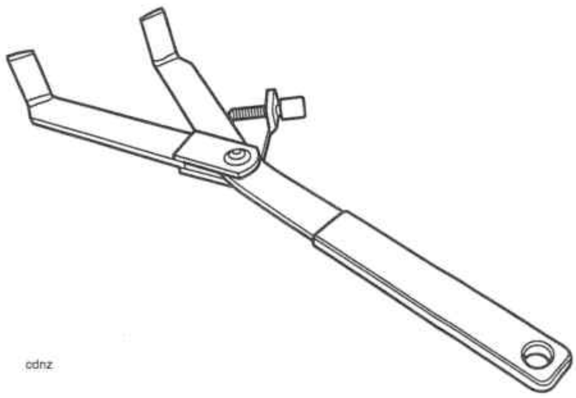
cdpr

3880160-T0301 – Fork Filler / Evacuator



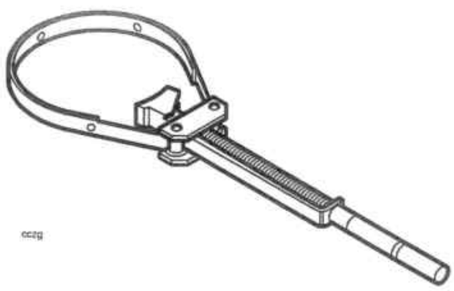
ccha

T3880026 – Clutch Holding Tool, Universal



cdnz

T3880375 – Alternator Rotor Holder

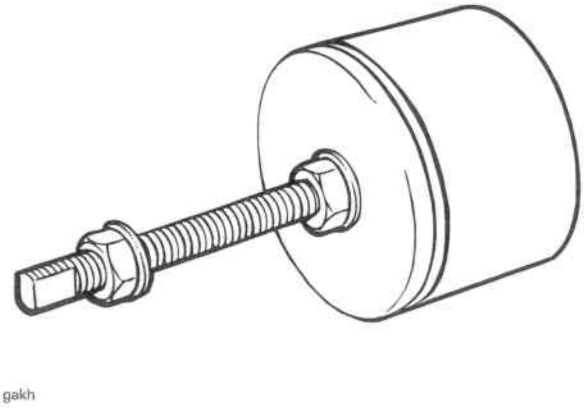


cczg

T3880312 – Oil Filter Wrench

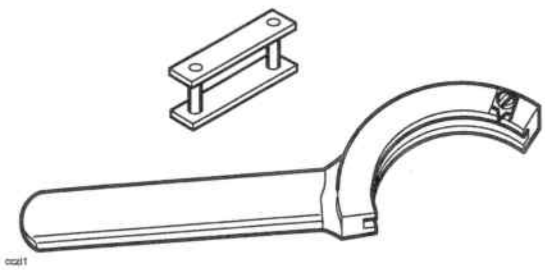
gahc

T3880101 – Extractor, Cylinder Liners

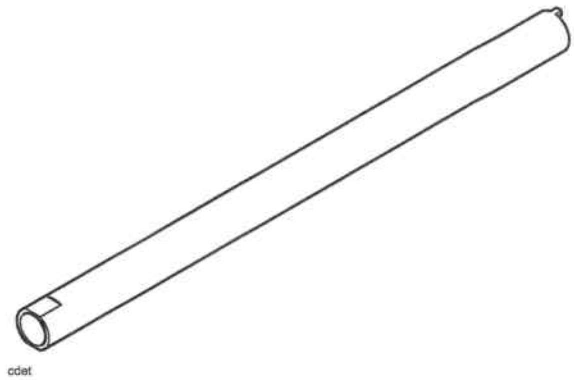


T3880365 – Puller, Alternator Rotor

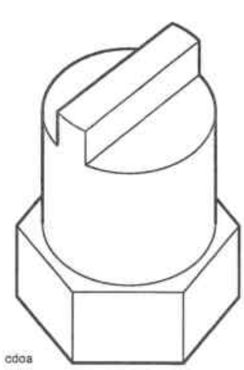
T3880106 – Holder, Balancer Gear



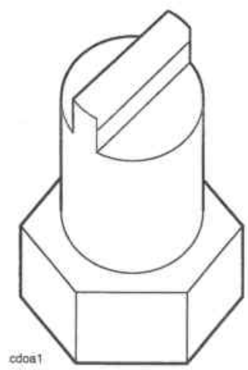
T3880028 – Holder, Damping Cylinder



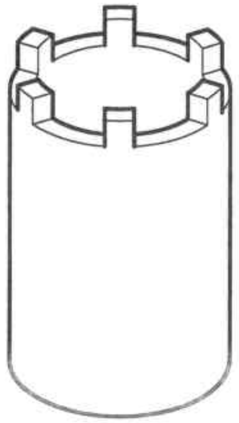
T3880104 – Wrench, Swinging Arm Adjuster



T3880103 – Wrench, Engine Mounting Adjuster

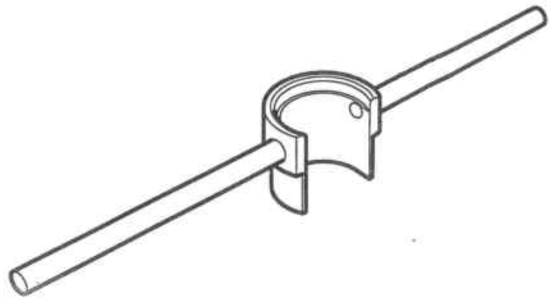


T3880024 – Socket 45 mm



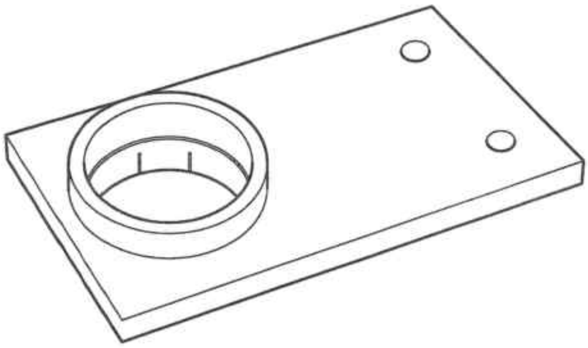
cdbp

T3880003 – Fork Seal and Bush Fitment



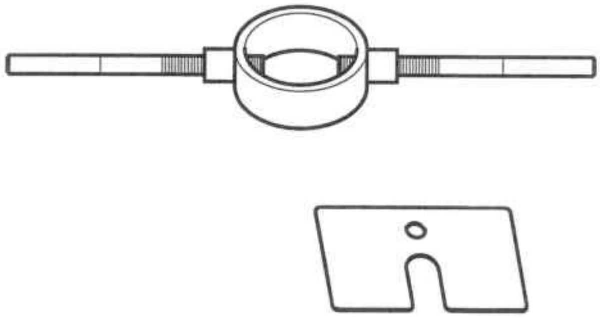
ccxb

T3880002 – Support Plate



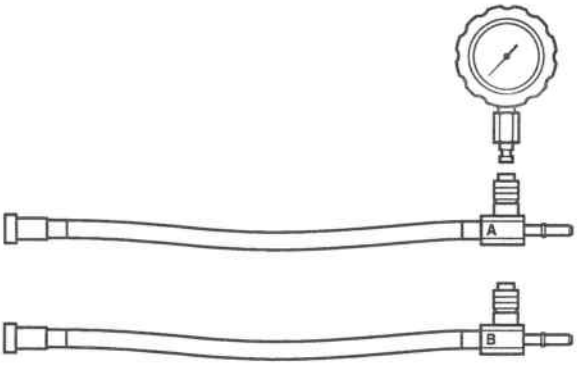
ccxa

T3880067 – Fork Spring Compressor



ccgw

T3880001 – Fuel Pressure Gauge



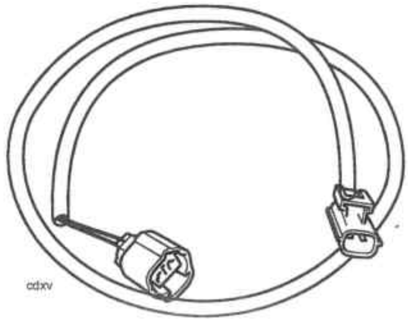
cdgh

3880065 – T0301 – Bearing Installer

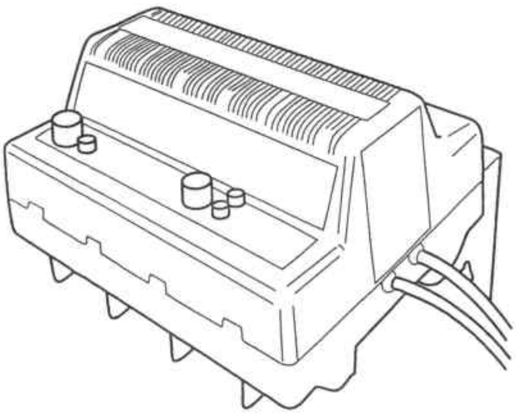
cczb1

3880070 – T0301 – Bearing Installer

T3880123 – Extension Cable



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



Full Specification — Daytona 675

Engine

Engine Configuration	3 Cylinder 12 valve DOHC
Arrangement	Transverse in-line
Displacement	674.8 cc
Bore x Stroke	74x52.3 mm
Compression Ratio	12.65:1
Cylinder Numbering	Left to Right (no.3 adjacent to camchain)
Cylinder Sequence	Number 1 at left
Firing Order	1-2-3
Maximum Power	125PS (123bhp) at 12,500 rpm
Maximum Torque	72 Nm (53.3 ft.lbf)at 11,750 rpm

Cylinder Head Valves

Valve Head Diameter	In	30.50 mm
	Ex	**25.50 mm**
Valve Lift	In	9.25 mm
	Ex	**8.50 mm**
Valve Stem Diameter	In	3.975-3.990 mm
Service Limit		**3.965 mm**
Valve Stem Diameter	**Ex**	**3.955-3.970 mm**
Service Limit		**3.945 mm**
Valve Guide Bore Diameter	In	4.000-4.015 mm
Service Limit		**4.043 mm**
Valve Guide Bore Diameter	**Ex**	**4.000-4.015 mm**
Service Limit		**4.043 mm**
Valve Stem to Guide Clearance	In	0.010-0.040 mm
Service Limit		0.078 mm
Valve Stem to Guide Clearance	**Ex**	**0.030-0.060 mm**
Service Limit		**0.098 mm**
Valve Seat Width (in head)	In	0.80-1.20 mm
Service Limit		**1.50 mm**
Valve Seat Width (in head)	**Ex**	**1.00-1.40 mm**
Service Limit		**1.70 mm**
Valve Seat Width (valve)	In	1.27-1.56 mm
	Ex	**1.34-1.63 mm**
Valve Seat Angle		45°
Inlet / Exhaust Valve Spring 'Load at Length'		508 N +/-25N at 27.5 mm
Valve Clearance	In	0.10-0.20 mm
	Ex.	**0.275-0.325 mm**

Full Specification **Daytona 675**

Cylinder Head Valves (continued)

Valve Bucket Diameter	In.	26.476-26.490 mm
Service Limit		26.468 mm
Valve Bucket Diameter	Ex	24.976-24.990 mm
Service Limit		24.968 mm
Valve Bucket Bore Diameter	In.	26.515-26.535 mm
Service Limit		26.549 mm
Valve Bucket Bore Diameter	Ex	25.015-25.035 mm
Service Limit		25.049 mm

Camshafts

Cam Timing	Inlet	Open 27.25° BTDC (@ 1.0 mm lift)
		Close 51.25° ABDC (@1.0 mm lift)
	Duration	258.50°
	Exhaust	Open 43° BBDC (@ 1.0 mm lift)
		Close 23° ATDC (@1.0 mm lift)
	Duration	246°
Camshaft Journal Diameter		23.900-23.930 mm
Camshaft Journal Clearance		0.070-0.121 mm
Service Limit		0.17 mm
Camshaft Journal Bore Diameter		24.000-24.021 mm
Camshaft End Float		0.23-0.33 mm
Service Limit		0.40 mm
Camshaft Run-out		0.15 mm max.

Clutch / Primary Drive

Primary Drive Type		Gear
Reduction Ratio		1.848 (46/85)
Clutch Type		Wet multi-plate
No. of Friction Plates		9
Plate Flatness		Within 0.2 mm
Friction Plate Thickness		3.00 mm
Service Limit		2.80 mm
Clutch Actuation Method		Cable
Cable Free Play (at lever)		2.0-3.0 mm

Full Specification	Daytona 675
Pistons	
Cylinder Bore Diameter	73.985-74.003 mm
Service Limit	**74.100 mm**
Piston Diameter (at 90° to gudgeon pin)	73.970-73.980 mm
Service Limit	**73.920 mm**
Piston Ring to Groove Clearances	
Top	0.04-0.08 mm
Service Limit	**0.095 mm**
Second	0.02-0.06 mm
Service Limit	**0.075 mm**
Piston Ring End Gaps	
Top	0.10-0.25 mm
Service Limit	**0.55 mm**
Second	0.25-0.40 mm
Service Limit	**0.70 mm**
Oil	0.10-0.35 mm
Gudgeon Pin Bore Diameter in Piston	16.004-16.012 mm
Service Limit	**16.040 mm**
Gudgeon Pin Diameter	15.995-16.000 mm
Service Limit	**15.985 mm**
Connecting Rods	
Connecting Rod Small End Diameter	16.016-16.029 mm
Service Limit	**16.039 mm**
Connecting Rod Big End Side Clearance	0.15-0.30 mm
Service Limit	**0.50 mm**
Crankshaft	
Crankshaft Big End Journal Diameter	32.984-33.000 mm
Service Limit	**32.960 mm**
Crankshaft Big End Bearing Clearance	0.035 mm-0.065
Service Limit	**0.070 mm**
Crankshaft Main Bearing Journal Diameter	32.984-33.000 mm
Service Limit	**32.960 mm**
Crankshaft Main Bearing Clearance	0.020 mm-0.044
Service Limit	**0.070 mm**
Crankshaft End Float	0.15-0.30 mm
Crankshaft Run-out	0.02 mm or less
Service Limit	**0.05 mm**

Full Specification — Daytona 675

Transmission

Type		6 Speed, Constant Mesh
Gear Ratios	1st	**2.615 (34/13)**
	2nd	**1.857 (39/21)**
	3rd	**1.565 (36/23)**
	4th	**1.350 (27/20)**
	5th	**1.238 (26/21)**
	6th	**1.136 (25/22)**
Gear Selector Fork Thickness		5.9-6.0 mm
Service Limit		5.80 mm
Gear Selector Groove Width		6.1-6.17 mm
Service Limit		**6.27 mm**
Gear Selector Fork to Groove Clearance		0.47 mm max.

Final Drive

Final Drive	Chain
Final Drive Ratio	2.937 (16/47)
Chain Type	RK O-ring
Number of Links	106
20 Link Length	319 mm
Drive Chain Play	35-40 mm
Chain Lubrication	Mobil chain spray

Lubrication

Type	Pressure Lubrication, Wet Sump
Oil Capacity (dry fill)	3.0 litres
Oil Capacity (wet fill including filter)	2.6 litres
Oil Capacity (wet fill excluding filter)	2.4 litres
Oil pressure (in main gallery)	**30.0 lb/in2 min. @ 80°C oil temperature @ 5,000 rpm**
Oil Pump Rotor Tip Clearance	0.15 mm
Service Limit	**0.20 mm**
Oil Pump Body Clearance	0.15-0.22 mm
Service Limit	**0.35 mm**
Oil Pump Rotor End Float	0.04-0.09 mm
Service Limit	**0.17 mm**

Full Specification **Daytona 675**

Ignition System

Type	Digital Inductive
Electronic Rev Limiter	14,000 (rpm)
Pick-up Coil Resistance	0.21 KW +/-10% @ 20°C
Ignition Coil Type	Plug-top
Spark Plug Type	NGK CR9EK
Spark Plug Gap	0.7 mm

Fuel System

Fuel Type	Unleaded, 95 RON (U.S. 89 CLC/AKI)
Fuel Tank Capacity	17.4 litres
Low Level Warning Lamp	4 litres remaining
Fuel Pump Type	Submerged
Fuel Pressure (nominal)	3.0 bar
Purge Control System	Electronic, via fuel system ECU

Fuel Injection System

Type	Electronic, sequential
Idle Speed	1200 RPM
Injector Type	Twin jet, solenoid operated plate valve
Throttle	Cable/twist grip/electronic throttle potentiometer
Control Sensors	Barometric pressure, throttle position, coolant temperature, crankshaft position sensor, lambda sensor, intake air temperature, vehicle speed sensor, gear position senosr, MAP sensor.

Emissions Controls

Catalysts	1, in down pipe
Oxygen sensor	Heated, in down pipe
Secondary Air injection	Solenoid controlled, reed valve type
Evaporative Control	Activated carbon canister (California only)

Coolant System

Coolant Mixture	50/50 Distilled water / anti-freeze
Anti-Freeze Type	Mobil anti-freeze
Freezing point	-35°C
Cooling System Capacity	2.4 litres
Radiator Cap Opening Pressure	1.1 bar
Thermostat Opening Temperature	71°C (nominal)

Full Specification	Daytona 675

Coolant System (continued)

Cooling Fan Switch On Temperature	103°C
Temperature Gauge Sensor Resistance	2.9 – 3.3 KW @ 15×C

Suspension

Front Fork Travel	110 mm
Recommended Fork Oil Grade	Kayaba KHL15-10
Oil Level (fork fully compressed)	72 mm
Oil Volume (dry fill)	495 cc
Fork Pull Through	4 mm
Rear Wheel Travel	130 mm
Rear Suspension Bearing Grease	Mobil grease HP 222

Brakes

Front Type	**Two hydraulically actuated four piston radial calipers acting on twin discs**
Caliper Piston Diameter	33.96 mm / 30.23 mm
Disc Diameter	308 mm
Disc Thickness	5 mm
Service Limit	**4.5 mm**
Disc Run-out	0.3 mm Max
Master Cylinder Diameter	19.05 mm
Recommended Fluid	Mobil universal brake and clutch fluid DOT4
Rear Type	**Hydraulically actuated single piston caliper, single disc**
Caliper Piston Diameter	38.18 mm
Disc Diameter	220 mm
Disc Thickness	5.0 mm
Service Limit	**4.5 mm**
Disc Run-out.	**0.3 mm Max**
Master Cylinder Diameter	14 mm
Recommended Fluid	Mobil universal brake and clutch fluid DOT4

Wheels and Tyres

Front Wheel Size		MT 3.5 x 17
Front Tyre Size		120/70 ZR 17
Front Tyre Pressure		2.35 Bar (34 lb/in²)
Recommended Front Tyre	**Option 1**	**Pirelli Dragon Supercorsa Pro**
	Option 2	**Michelin Pilot Power B**
	Option 3	**Bridgestone BT014 G**
Front Wheel Rim Axial Run-out		0.5 mm

Full Specification		**Daytona 675**
Wheels and Tyres (continued)		
Front Wheel Rim Radial Run-out		**0.5 mm**
Rear Wheel Size		MT 5.5 x 17
Rear Tyre Size		180/55 ZR 17
Rear Tyre Pressure		**2.5 Bar (36 lb/ft^2)**
Recommended Rear Tyres	**Option 1**	**Pirelli Dragon Supercorsa Pro**
	Option 2	**Michelin Pilot Power B**
	Option 3	**Bridgestone BT014 G**
Rear Wheel Rim Axial Run-out		0.5 mm
Rear Wheel Rim Radial Run-out		0.5 mm

Frame

Frame Type	Twin-spar aluminium
Overall Length	2110 mm (79.1 in)
Overall Width	700 mm (27.5 in)
Overall Height	1120 mm (44.1 in)
Wheelbase	1395 mm (54.9 in)
Seat Height	825 mm (32.5 in)
Castor	23.9 °
Trail	89.1 mm
Dry Weight	165 kg
Maximum Payload (rider, passenger, luggage and accessories)	195 kg

Electrical Equipment

Battery Type		YT 7B - BS	
Battery Rating		12V – 6.5 Amp. Hour	
Alternator Rating		33.5 A at 4,000 rpm	
Fuses*	**#1**	**Dip and main beam headlights, starter relay**	**15 Amp**
	#2	**Ignition switch, starter circuit**	**10 Amp**
	#3	**Auxilliary lighting**	**5 Amp**
	#4	**Indicators, Alarm, Horn**	**10 Amp**
	#5	**Cooling fan.**	**15 Amp**
	#6	**Engine management system**	**20 Amp**

***The starter solenoid has an additional 30 Amp fuse, attached directly to the solenoid, beneath the rider's seat.**

Torque Wrench Settings

Cylinder Head Area

Application	Torque (Nm)	Notes
Cam cover to cylinder head	12	
Secondary air injection valve covers to cam cover	9	
Cam chain tensioner to cylinder head	9	
Cam chain tensioner to centre bolt	7	
Camshaft bearing caps and camshaft bearing ladder to head	See section 3	
Camshaft sprocket to camshaft	15	Use new fixings
Cylinder head to crankcase (M6 screws)	10	
Cylinder head to crankcase bolts	See section 3	
Sound suppression bolt in head	10	
Spark plug to cylinder head	21	

Clutch

Application	Torque (Nm)	Notes
Clutch cover to crankcase	9	
Clutch centre nut	98	
Clutch pressure plate to centre	7	
Clutch lever to handlebar	15	
Clutch cable adjuster bracket to crankcase	12	

Crankshaft and Crankcase, Sprag

Application	Torque (Nm)	Notes
Crankcase upper to lower (M8 fixings)	See section 6	
Crankcase upper to lower (M6 fixings)	See section 6	
Connecting rod big end nut	See section 6	
Big end bearings	See section 6	
Sprag clutch to crankshaft	See section 7	

Engine Covers

Application	Torque (Nm)	Notes
Clutch cover to crankcase	9	
Sprocket cover to crankcase	9	
Alternator cover to crankcase	9	
Crank cover to crankcase	9	
Balancer cover to crankcase	9	

Transmission

Application	Torque (Nm)	Notes
Output sprocket to output shaft	85	Use new tab washer, ApplyThreeBond 1347 to threads
Detent wheel to selector drum	12	Use a new fixing
Detent arm bolt	12	Use a new fixing
Input shaft bearing carrier	12	Use new fixings
Selector shaft retainer	12	Use new fixings
Spring abutment bolt	20	
Gear position sensor	5	
Gear pedal pinch bolt	9	
Gear pedal pivot bolt	22	

Lubrication System

Application	Torque (Nm)	Notes
Sump to crankcase	12	
Sump drain plug to sump	25	Use a new washer
Oil pressure relief valve to crankcase	15	Apply ThreeBond 1305 to the threads
Low oil pressure warning light switch to crankcase	13	Use new washers
Oil filter to adapter	10	
Heat exchanger to crankase	59	Use a new sealing washer
Oil pump drive chain retainer plate	9	Use new fixings
Oil pump to crankcase	10	Use new fixings
Oil pump drive sprocket to pump shaft	15	
Transmission oil feed pipes to crankcase	10	Use new fixings

General Information

Final Drive

Application	Torque (Nm)	Notes
Rear sprocket to sprocket carrier	55	
Rear sprocket studs to sprocket carrier	30	Use new fixings
Chain guard bolts	9	
Chain rubbing strip to swinging arm	9	

Cooling System

Application	Torque (Nm)	Notes
Water pump/oil pump assembly to crankcase	10	Use new fixings
Upper right hand radiator mounting to frame	6	
Upper left hand radiator mounting to frame/steering damper	12	
Lower radiator mounting to radiator	3	
Lower radiator mounting to engine	9	
Water inlet elbow to head	12	
Thermostat housing to head	10	
Fan shroud to radiator	9	

Fuel System, Exhaust System and Airbox

Application	Torque (Nm)	Notes
Fuel tank to frame (front fixing)	9	
Fuel tank to frame (rear fixing)	9	
Fuel cap to fuel tank	4	
Fuel pump mounting plate to fuel tank	9	
Throttle body transition piece to cylinder head	12	
Throttle potentiometer to throttle body	3.5	
Exhaust downpipe to cylinder head	See section 10	
Exhaust downpipe to frame	19	
Exhaust secondary header to frame	22	
Silencer mounting bracket to frame	27	
Exhaust clamps to downpipe	21	
Airbox upper section to lower	1.5	
Air filter to lower airbox	4	
Airbox lower to frame	3	
Airbox trumpet to throttle body	4	
Carbon canister to bracket	3	
Carbon canister bracket to frame	8	

Rear Suspension

Application	Torque (Nm)	Notes
Swinging arm spindle bolt	60	
Swinging arm rubbing strip bolts	9	
Chain adjuster locknut	27	
Rear suspension unit upper mounting bolt	40	
Rear suspension unit upper clevis to frame	52	
Rear suspension unit lower mounting bolt	48	
Drag link pivot at frame	48	
Drop links to swinging arm	48	
Swinging arm end-float adjuster	15	
Swinging arm lateral adjuster lock ring	30	

Front Suspension

Application	Torque (Nm)	Notes
Upper yoke pinch bolt	27	
Lower yoke pinch bolt	20	
Fork top cap	See text	
Upper yoke centre nut	40	
Damping cylinder bolt	See text	Use a new washer
Handlebar clamp to fork	27	
Steering damper to lower yoke	18	
Steering damper to bracket	18	
Steering damper bracket to frame	12	
Steering damper rod lock nut	27	

Wheels

Application	Torque (Nm)	Notes
Front wheel spindle / axle bolt	65	
Front wheel spindle pinch bolts	20	
Rear wheel spindle / axle bolt	110	

General Information

Front Brakes

Application	Torque (Nm)	Notes
Front brake caliper to fork	35	
Front brake pad retaining pin	18	
Front brake caliper bleed screw	6	
Front brake hose to caliper	25	
Front brake master cylinder to handlebar	15	
Front brake master cylinder reservoir to mounting	7	
Front brake hose to master cylinder	25	
Front brake disc to wheel	22	Use new fixings

Rear Brakes

Application	Torque (Nm)	Notes
Rear brake caliper to carrier (M12 fixing)	29	
Rear brake caliper to carrier (M8 fixing)	25	
Rear brake pad retaining pin	19	
Rear brake pad retaining pin plug	2	
Rear brake caliper bleed screw	6	
Rear brake hose to caliper	25	
Rear brake hose clips to swinging arm	6	
Rear brake master cylinder to control plate	18	
Rear brake lever to control plate	22	Apply ThreeBond 1360 to the threads
Rear brake master cylinder reservoir to frame	7	
Rear brake hose to master cylinder	25	
Rear brake disc to wheel	22	Use new fixings

Frame, Footrests, Control Plates and Engine Mountings

Application	Torque (Nm)	Notes
Upper crankcase to frame	See section 9	
Lower crankcase to frame	See section 9	
Cylinder head to frame	See section 9	
Engine mounting bracket to frame	See section 9	
Engine mounting bracket to cylinder head	See section 9	
Control plate to frame	27	Use new fixings
Heel guard to control plate	9	
Rear footrest hanger to frame	27	
Side stand mounting bracket	45	
Side stand pivot	20	

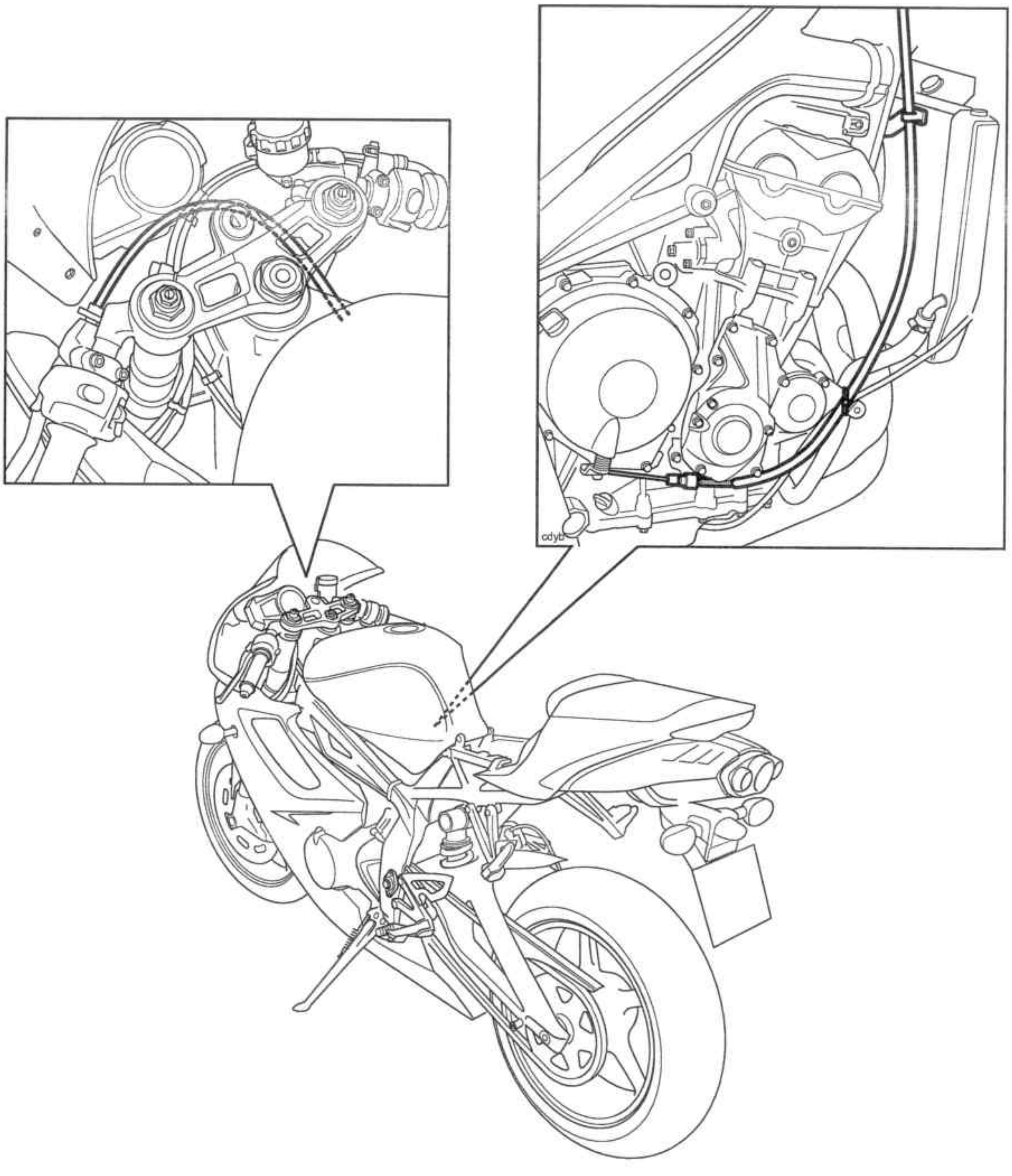
Electrical

Application	Torque (Nm)	Notes
Alternator rotor to crankshaft	120	
Alternator stator to cover	12	
Alternator regulator to frame	3	
Starter motor to crankcase	10	
Spark plug to cylinder head	21	

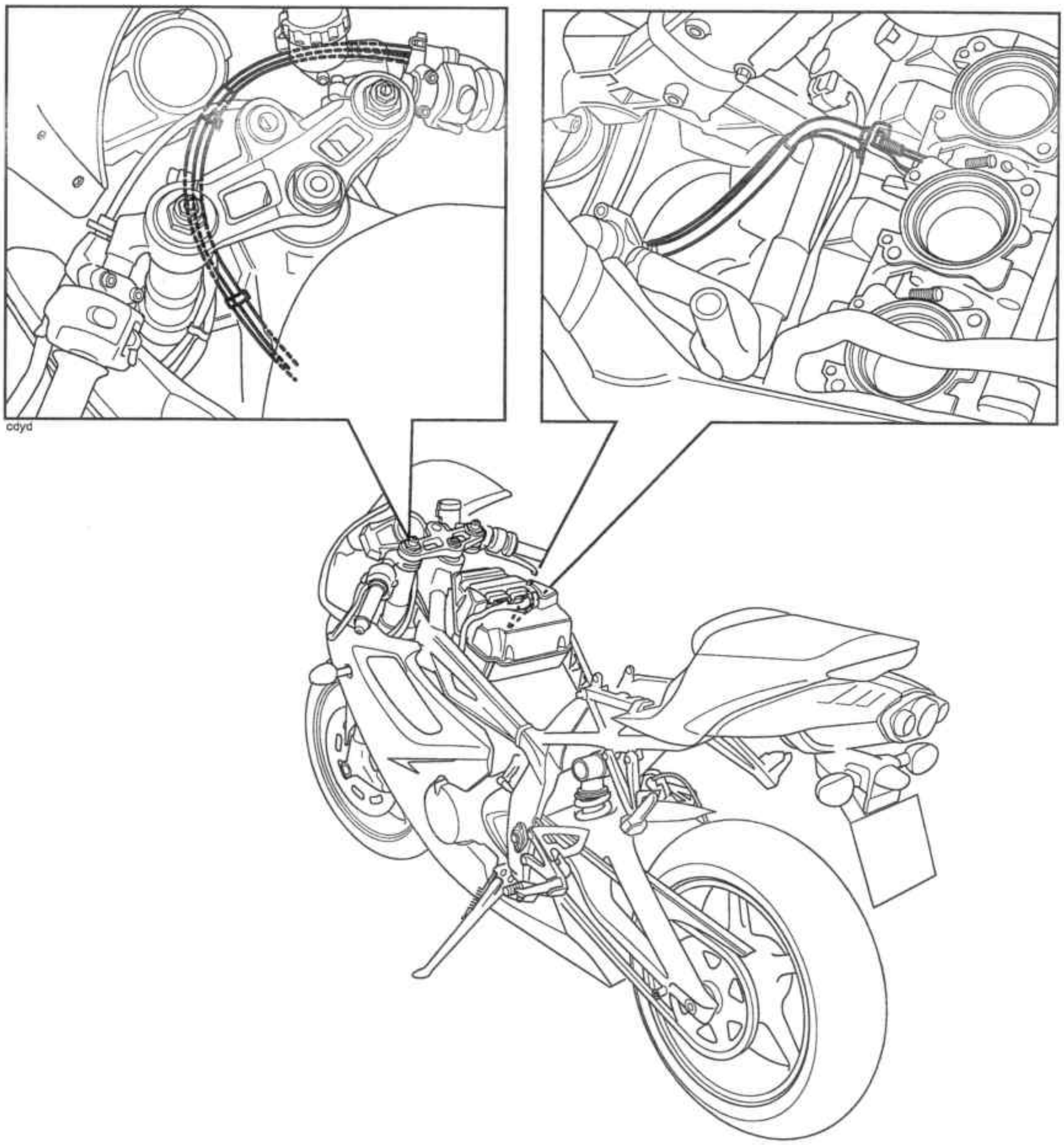
Bodywork

Application	Torque (Nm)	Notes
Mirror	9	
Rear panels to frame	3	
Front mudguard to forks	3	
Rear mudguard to subframe	10	
Number plate bracket to silencer	12	
Heat shield to silencer	6	
Lower fairing fixings	See section 16	
Cockpit fixings	See section 16	

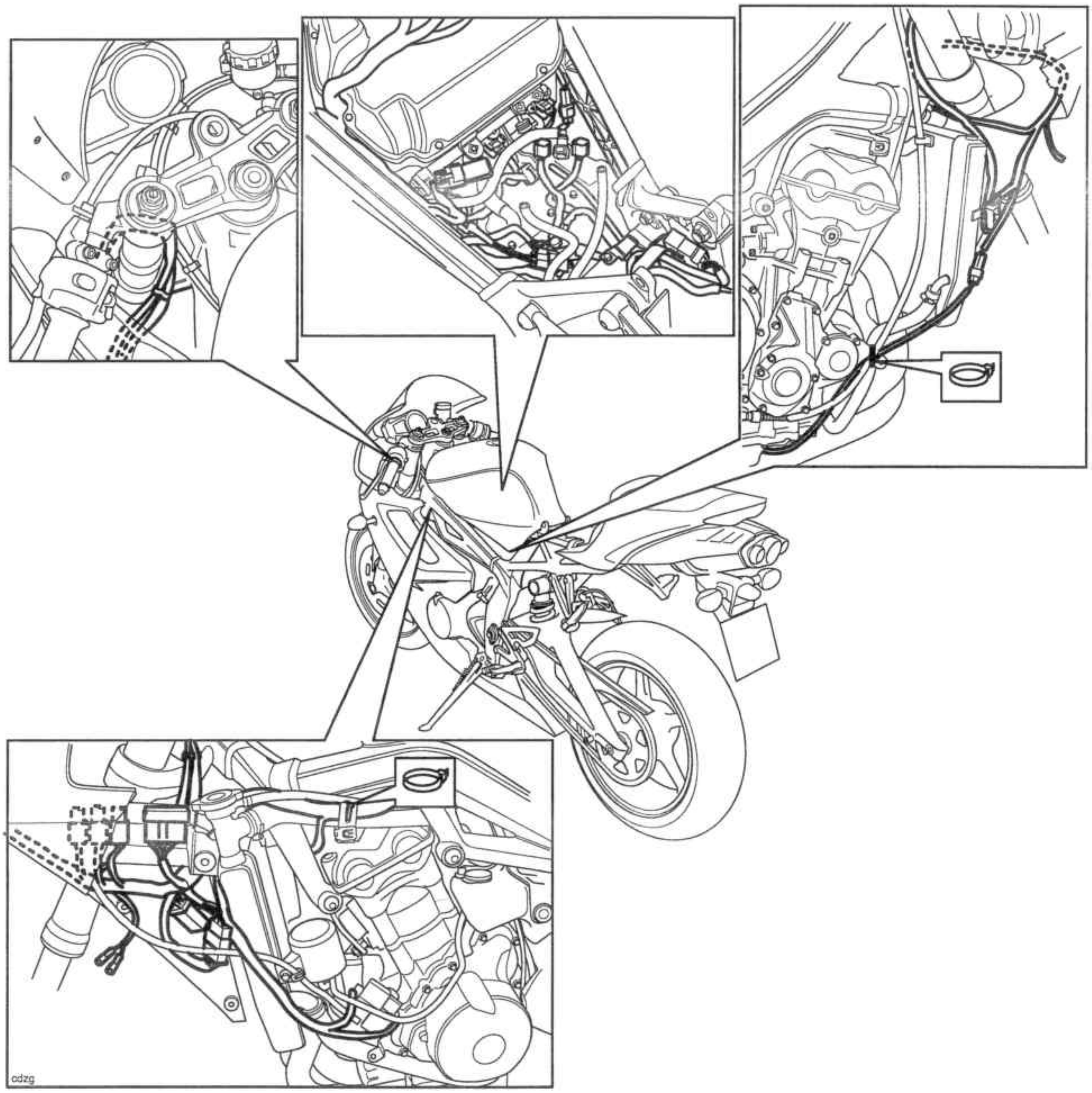
Clutch Cable Routing



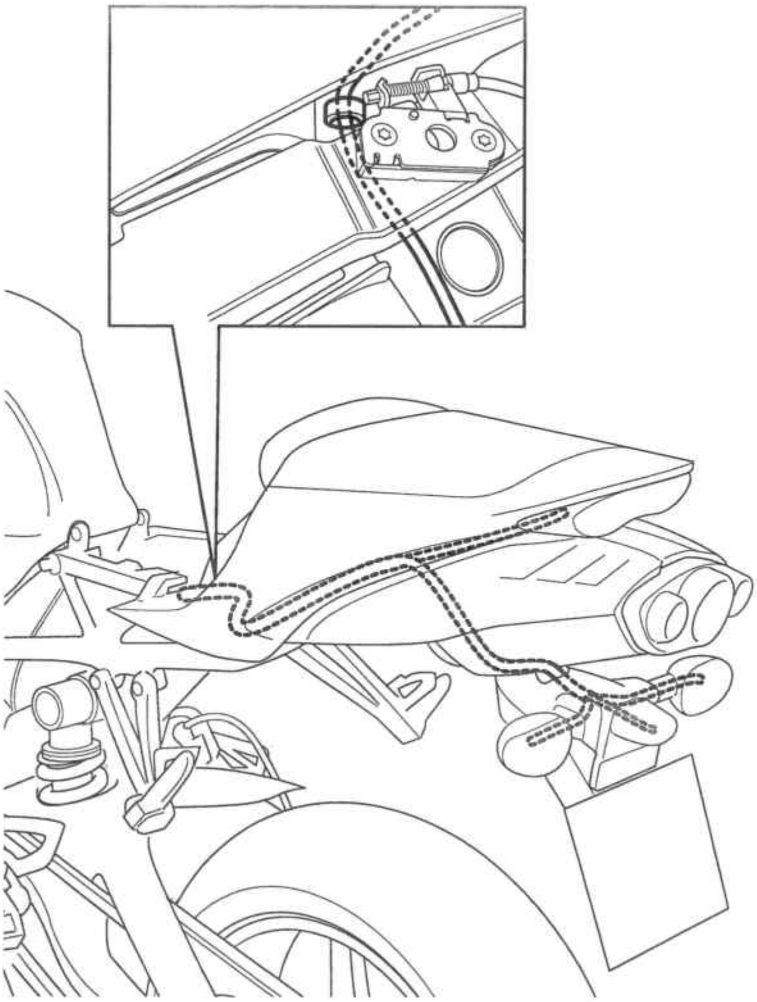
Throttle Cable Routing



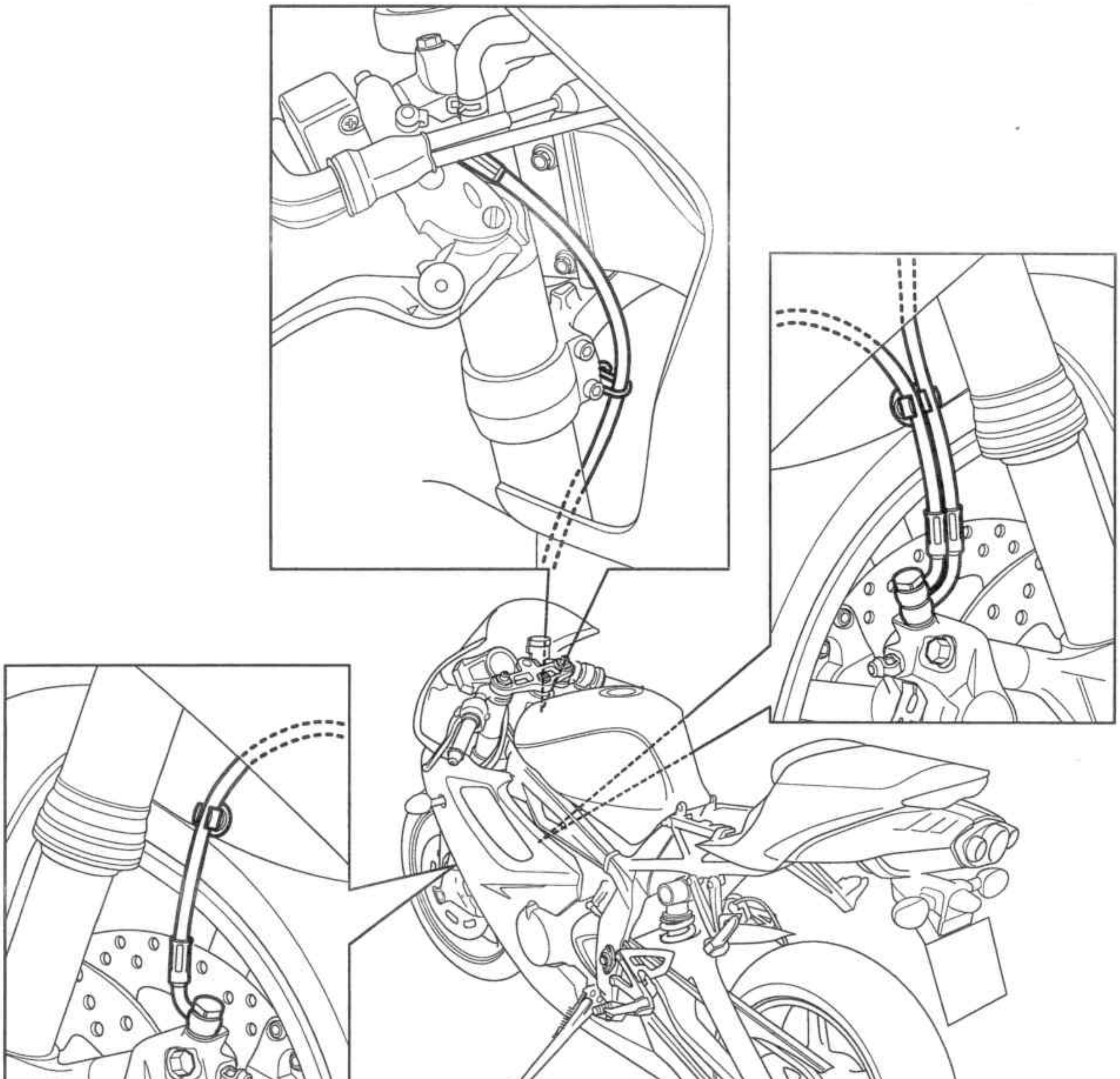
Main Wiring Harness Routing



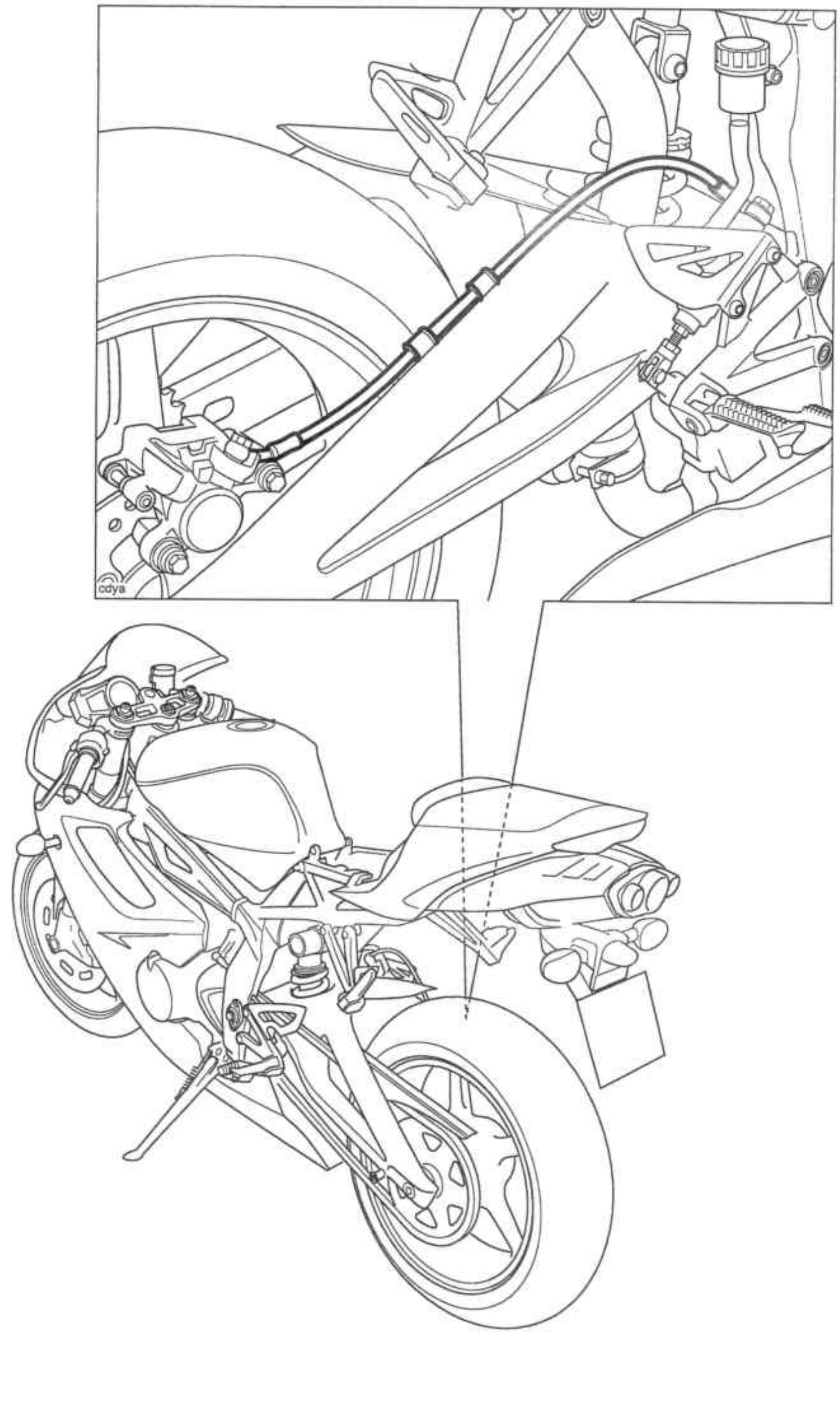
Rear Light Harness Routing



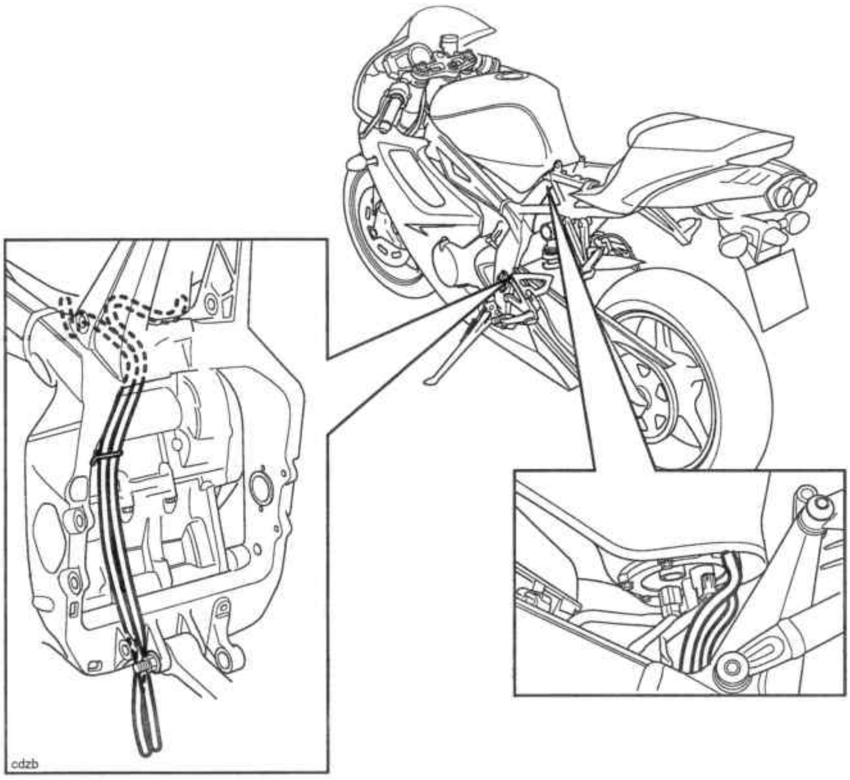
Front Brake Hose Routing



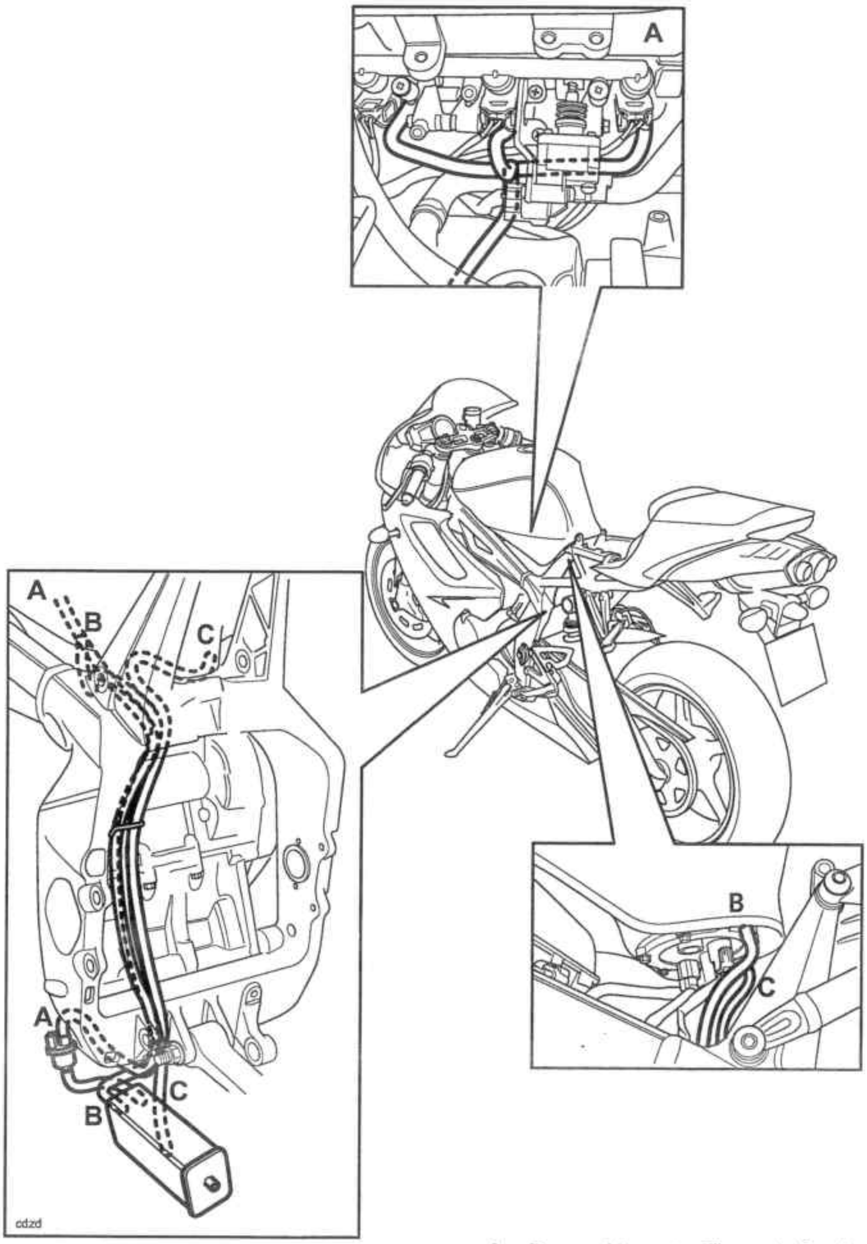
Rear Brake Hose Routing



Fuel Tank Breather Hose Routing



Fuel Tank Breather Hose Routing - Models with Evaporative Emissions

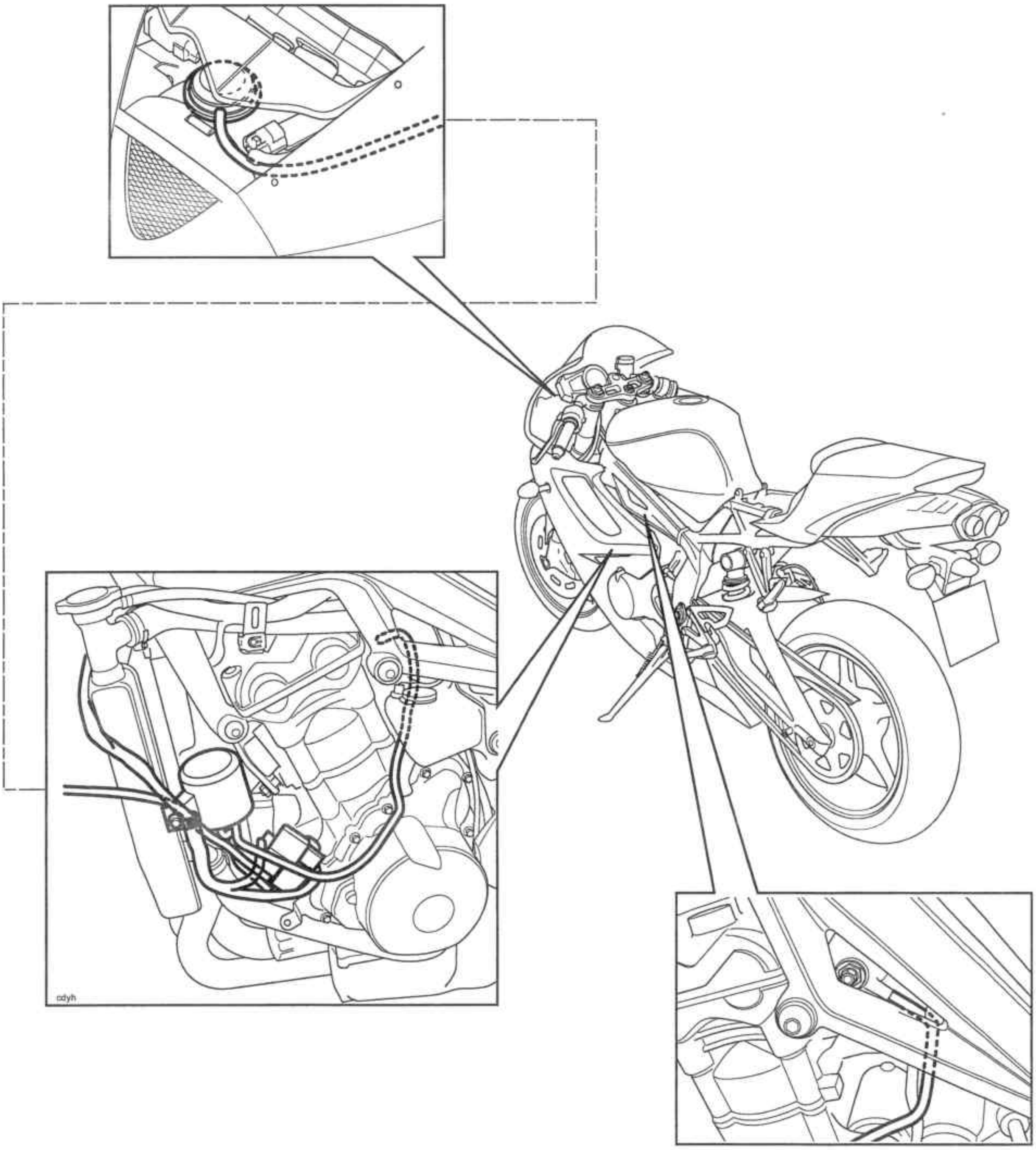


A - Purge Hose to Throttle Bodies

B - Breather Hose to Carbon Canister

C - Breather hose - Fuel Tank Filler Drain

Intake Air Flap Vacuum Hose Routing



2 Scheduled Maintenance

Table of Contents

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	Every	Odometer Reading in Miles (Kms) or time period, whichever comes first					
		500 (800) 1 month	6,000 (10,000) 1 year	12,000 (20,000) 2 years	18,000 (30,000) 3 years	24,000 (40,000) 4 years	30,000 (50,000) 5 years
Engine oil cooler - check for leaks	-	•	•	•	•	•	•
Engine oil - renew	-	•	•	•	•	•	•
Engine oil filter - renew	-	•	•	•	•	•	•
Valve clearances - check	-			•		•	
Air cleaner - renew	-			•		•	
Engine ECM - check for stored DTCs	-	•	•	•	•	•	•
Spark plugs - check	-		•		•		•
Spark plugs - renew	-			•		•	
Throttle bodies - balance	-		•	•	•	•	•
Throttle cables - check/adjust	Day	•	•	•	•	•	•
Cooling system - check for leaks	Day	•	•	•	•	•	•
Coolant level - check/adjust	Day	•	•		•		•
Coolant - renew	-			•		•	
Fuel system - check for leaks	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	-			•		•	
Brake pad wear - check	Day	•	•	•	•	•	•
Brake master cylinders – check for oil leaks		•	•	•	•	•	•
Brake calipers - check for leaks and seized pistons		•	•	•	•	•	•
Drive chain - lubricate	Every 200 miles (300 kms)						
Drive chain – wear check	Every 500miles (800kms)						
Drive chain slack – check/adjust	Day	•	•	•	•	•	•
Drive rubbing strip - check	-		•	•	•	•	•
Rear wheel bearing - lubricate	-			•		•	
Fasteners - inspect visually for security	Day	•	•	•	•	•	•
Wheels - inspect for damage	Day	•	•	•	•	•	•
Tyre wear/tyre damage - check	Day	•	•	•	•	•	•
Tyre pressures - check/adjust	Day	•	•	•	•	•	•
Clutch cable - check/adjust	Day	•	•	•	•	•	•
Secondary air injection system - check	-			•		•	
Stand - check operation	Day	•	•	•	•	•	•
Exhaust butterfly valve cables - check/adjust					•		
Fuel and evaporative loss* hoses - renew	-					•	

*Evaporative system fitted to California models only.

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3 Cylinder Head

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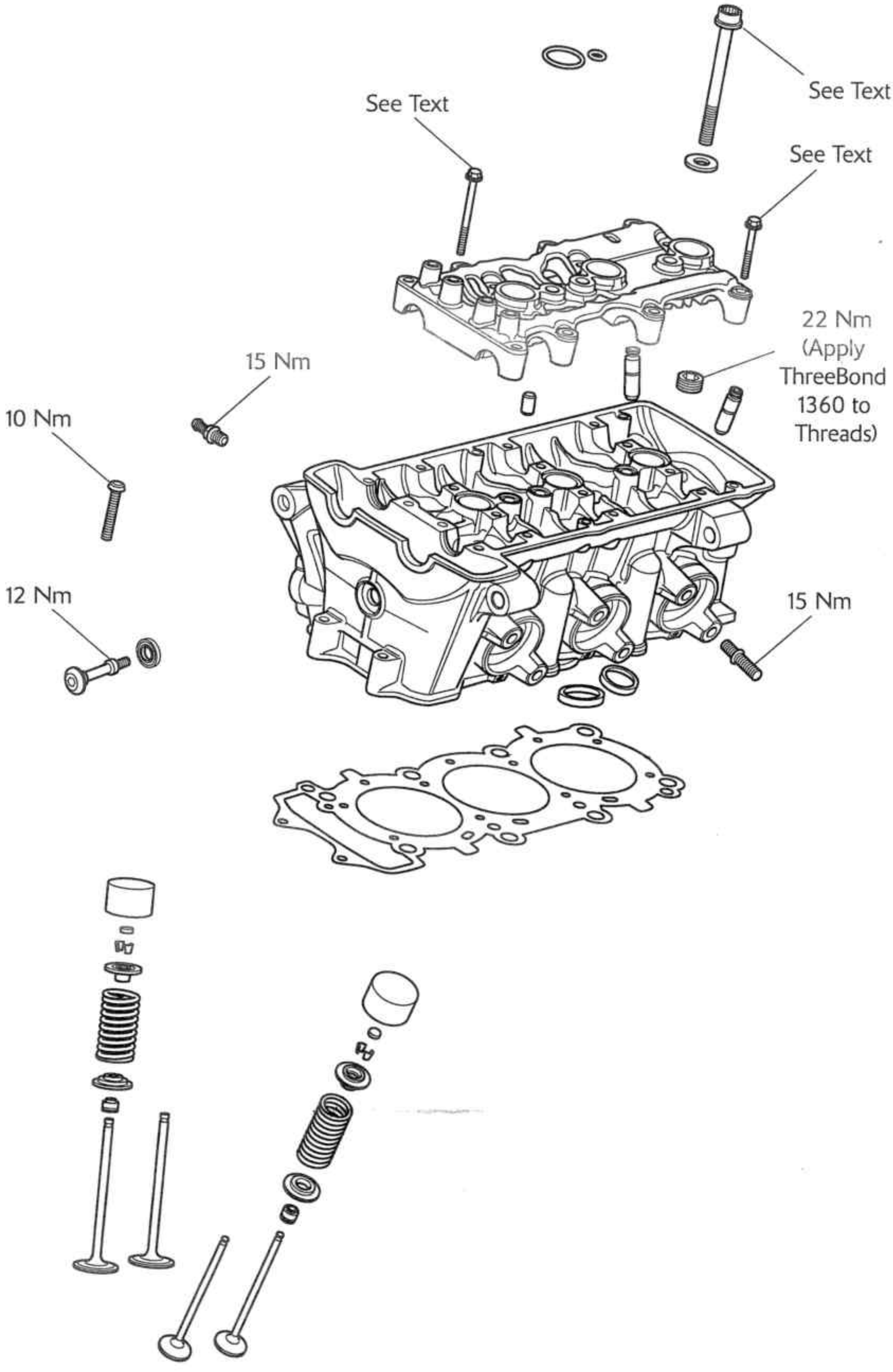
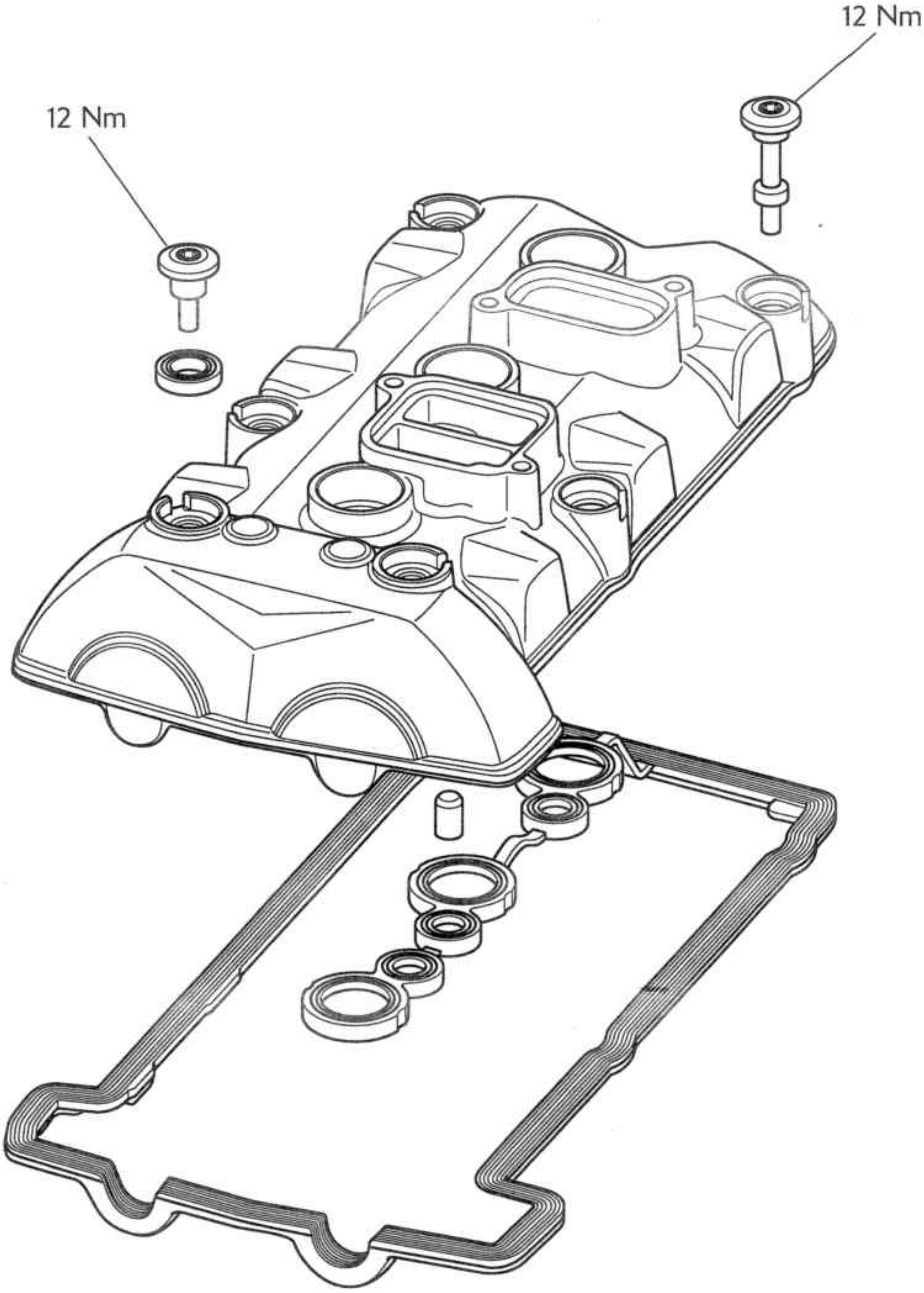
Cylinder Head

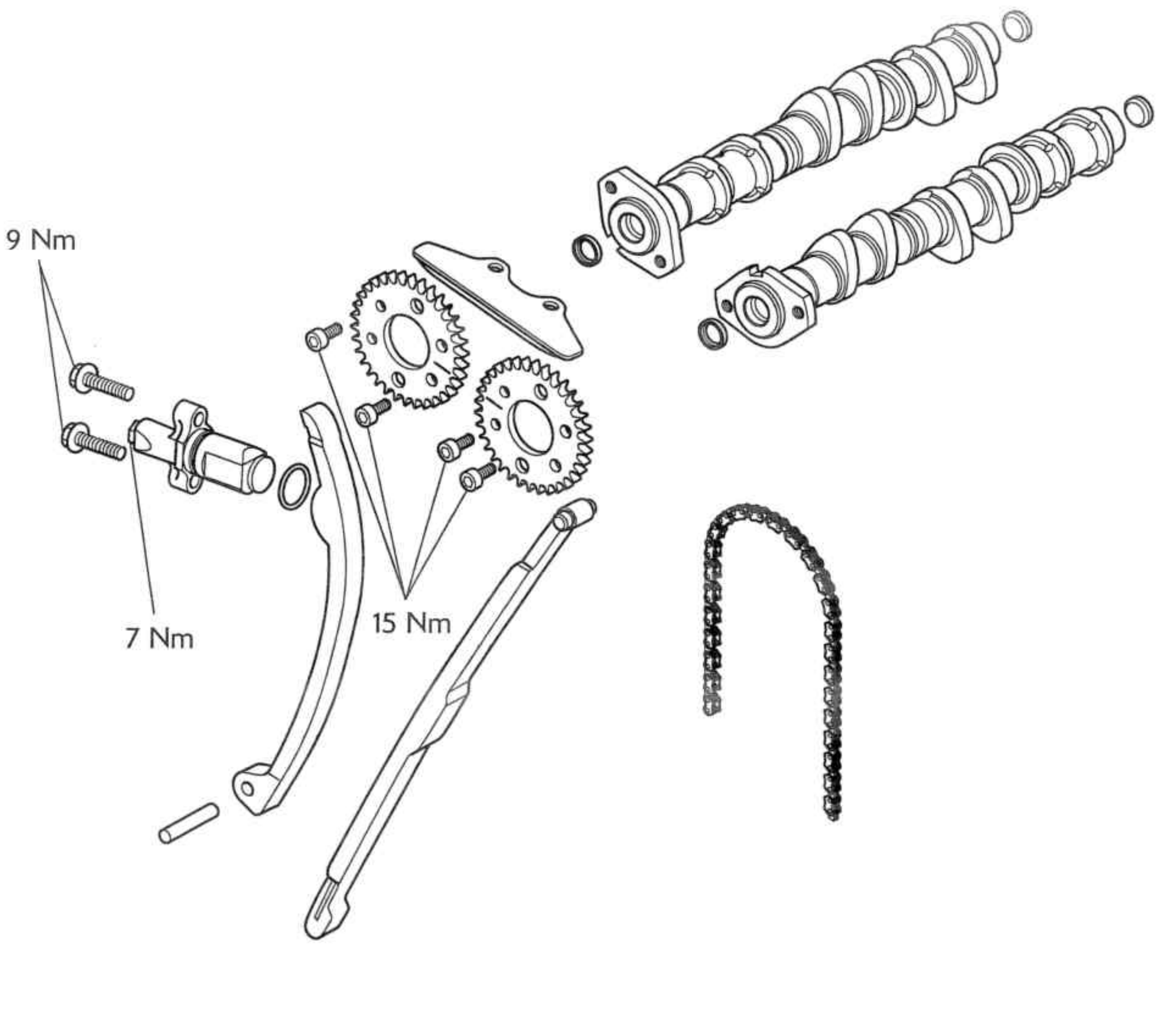
Exploded View - Cylinder Head and Valves



Exploded View - Cam Cover



Exploded View - Camshaft and Camshaft Drive



Cylinder Head Description

The engine is fitted with an aluminium alloy cylinder head, which carries the camshafts, valves and spark plugs. The cylinder head is cast as a single entity and various components are permanently added after machining.

The camshafts run directly in the head without separate bearings. Valve clearances are adjusted by changing variable thickness shims which sit between the valve tappet bucket and the valves.

The camshafts are driven by a silent-type chain. The cam chain is tensioned by a spring loaded device fitted in the cylinder head, and is guided by two rubber blades.

Oil is supplied to the head by an internal gallery. Once supplied to the head, the oil is distributed along internal drillings within the head casting and camshaft.

Single valve springs are used to close both the inlet and exhaust valves. These valve springs have close wound coils at one end to assist in the prevention of valve bounce at high engine speed and to give a smooth valve actuation. When assembling the cylinder head it is important that the close wound, colour coded ends of the springs are fitted downwards (towards the piston). The tip of the inlet valves are hardened to give a long service life.

Due to the methods used to assemble the valve seat and valve guides to the head, these parts cannot be replaced.

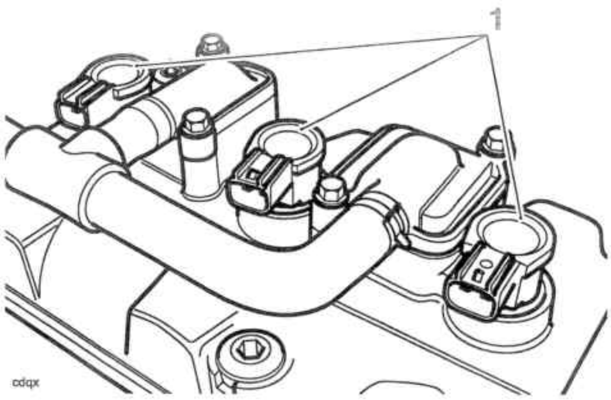
Caution

In any of the following operations which necessitate the removal or disconnection of the cam chain, NEVER turn the engine without the cam chain and tensioner correctly fitted and adjusted. In the disassembled condition, the pistons will contact the valves if the crankshaft is turned, causing severe engine damage.

Cam Cover

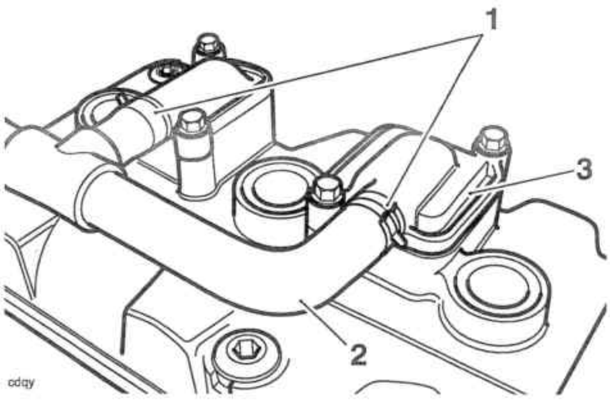
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the lower fairings (see page *16-13*).
4. Remove the fuel tank (see page *10-105*).
5. Remove the airbox (see page *10-110*).
6. Remove the ignition coils from the cam cover.



1. Ignition coils

7. Detach the secondary air injection hose from the reed valves on top of the cam cover (see page *10-142*).



1. Spring-close hose clip
2. Secondary air injection hose
3. Reed valve assembly

8. Remove the throttle bodies, injectors and fuel rail from the cylinder head (see page *10-117*).

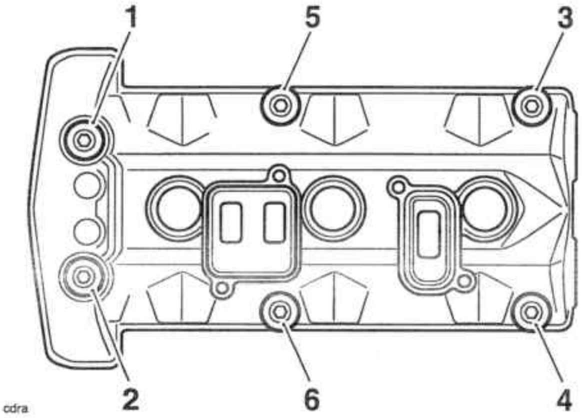
Note:

9. It is not necessary to disconnect the throttle cables. Instead, lay the assembly over the frame during the period when the engine is separated from the frame.

10. Progressively release the cam cover bolts in the sequence shown below.

Note:

- **Two shorter bolts are fitted at the end adjacent to the cam chain.**



Cam Cover Bolt Release Sequence

11. Remove the cam cover from the motorcycle.

Caution

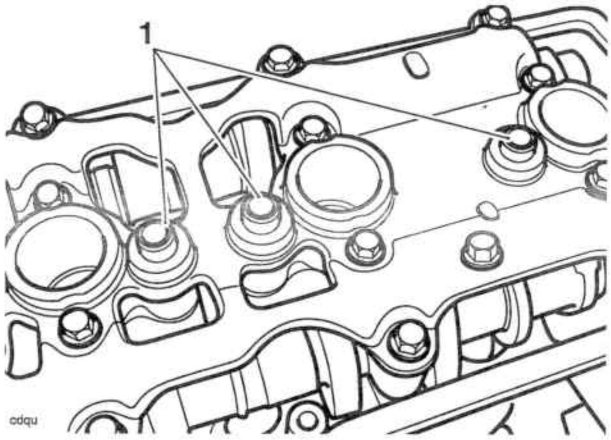
Never use a lever to remove the camshaft cover from the head.

Using a lever will cause damage to the head and cam cover which could lead to an oil leak.

12. Remove the cam cover gasket. If necessary, recover the three dowels from the secondary air injection holes in the cam ladder (these may come away in the cover or gasket).
13. Remove any residual oil from the front of the head using a syringe or lint free cloth.

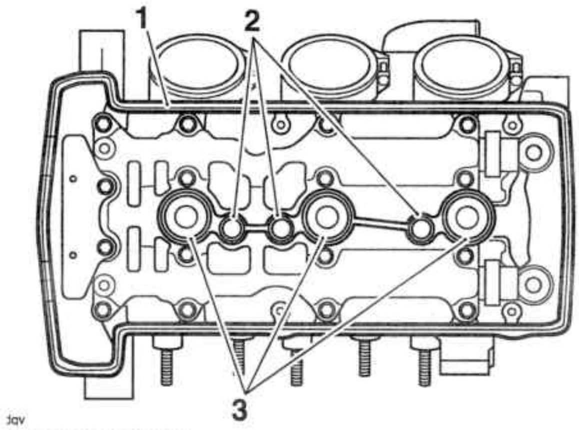
Installation

1. Check the condition of the cam cover gasket. Replace as necessary.
2. Check the condition of the cam cover bolt seals. Replace as necessary.
3. Refit the three dowels to the cam ladder.



1. Dowels

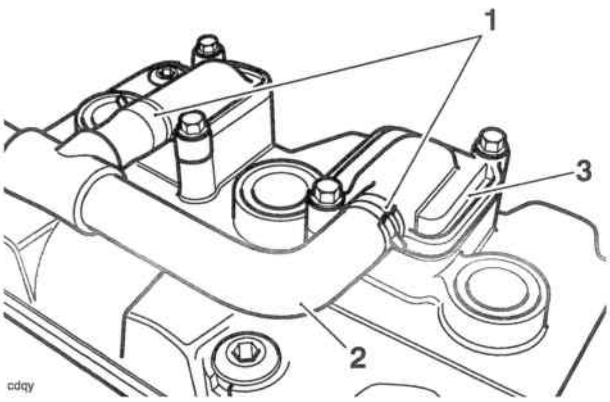
4. Fit the cam cover seal to the cylinder head. Ensure the groove in the gasket is correctly seated to the head. Ensure the plug tower seals and the dowels are correctly located.



1. Cam cover seal
2. Dowels
3. Plug tower seals

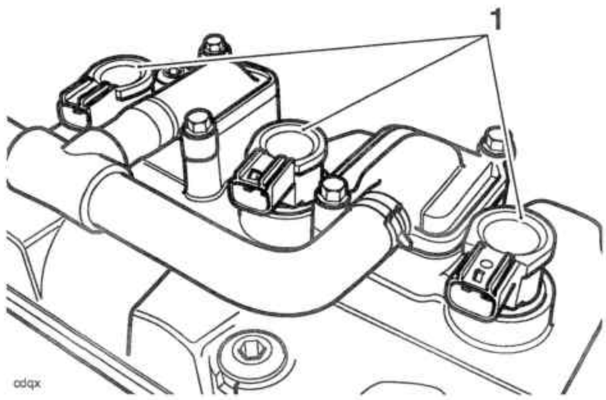
5. Fit the cam cover, ensuring that the gasket remains in the correct position.
6. Fit the cam cover screws and screw seals and tighten until finger tight.
7. Finally, tighten the cam cover screws, in the same order as for removal, to **12 Nm**.
8. Refit the throttle bodies, injectors and fuel rail to the cylinder head (see page *10-120*).

9. Check the throttle cable adjustment (see page *10-116*).
10. Refit the secondary air injection hose to the reed valves (see page *10-143*).



1. Spring-close hose clip
2. Secondary air injection hose
3. Reed valve assembly

11. Fit the ignition coils and reconnect the electrical connectors.



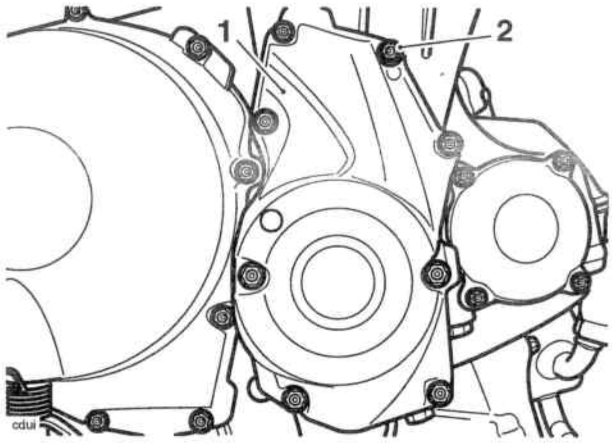
1. Coils

12. Refit the airbox (see page *10-111*).
13. Refit the fuel tank (see page *10-106*).
14. Refit the lower fairings (see page *16-14*).
15. Reconnect the battery, positive (red) lead first.
16. Refit the rider's seat (see page *16-11*).

Cam Chain Tensioner

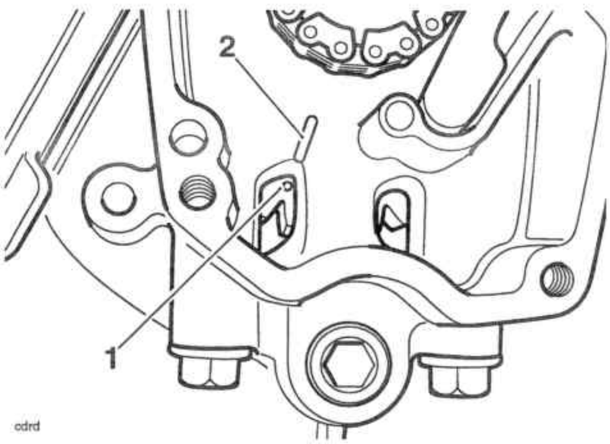
Removal

1. Remove the cam cover (see page *3-5*).
2. Noting the position of the bolt fitted with the copper washer, remove the right hand crank cover. Discard the gasket.



1. Right hand crank cover
2. Copper washer position

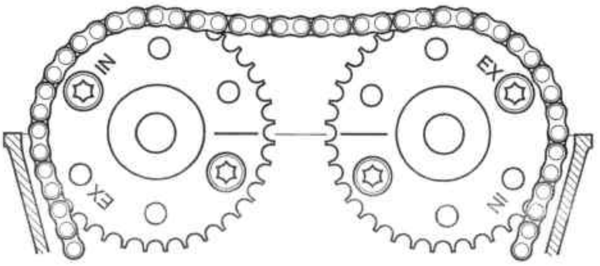
3. Rotate the crankshaft clockwise (the normal direction of rotation), using the bolt fitted to the end of the crankshaft. Stop rotation when number 1 cylinder is at top dead centre (TDC), that is when the dot mark on the primary gear aligns with the line on the crankcase.



1. Dot mark
2. Marker line

Note:

- **In addition to the dot mark alignment, at TDC, the alignment marks on the camshaft sprockets will point inwards at a point level with the joint face.**

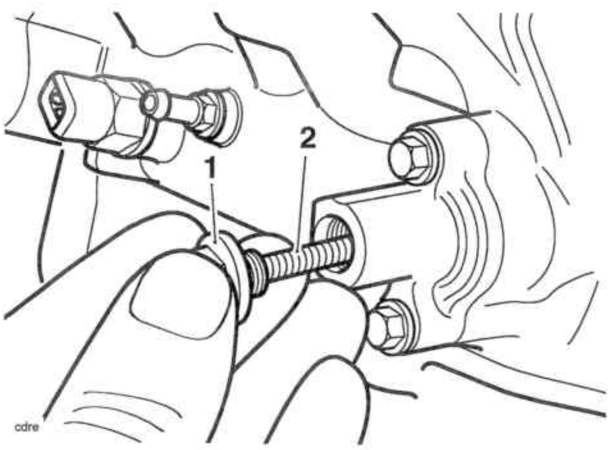


Camshaft to Cylinder Head Alignment Marks

4. Place a suitable wedge between the cam chain tensioner blade and crankcase, to hold the cam chain taut during removal of the tensioner.

> **⚠ Warning**
>
> The tensioner centre nut is under spring tension. Always wear hand, eye and face protection when withdrawing the centre nut and take great care in order to minimise the risk of injury and loss of components.

5. Carefully remove the centre nut from the tensioner and withdraw the tensioner spring.

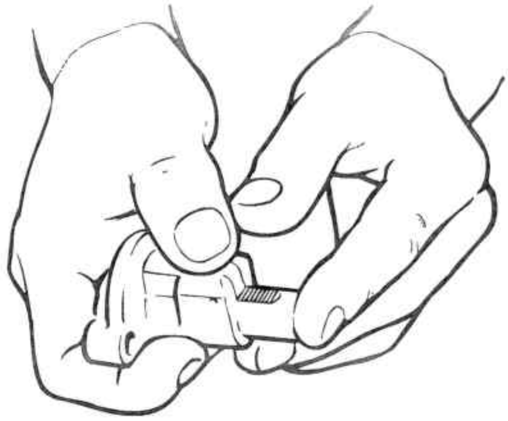


1. Centre nut
2. Spring

6. Remove and discard the bolts securing the tensioner to the cylinder head. Remove the tensioner.

Installation

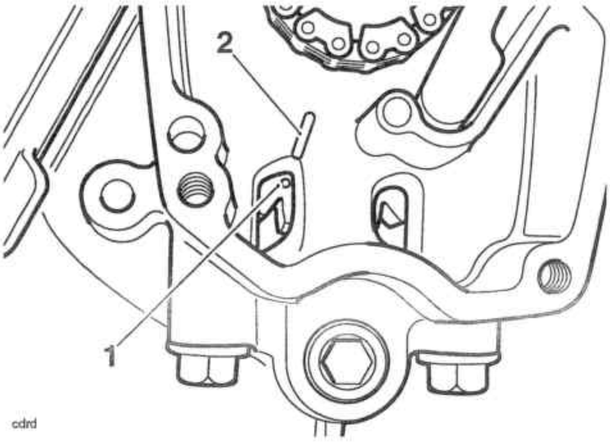
1. Check that number 1 cylinder is still at top dead centre (TDC).
2. Ensure that the wedge fitted earlier is still holding the cam chain tensioner blade in contact with the cam chain. Check that the camshaft timing marks point inwards and are level with the joint face of the head.
3. Check that the cam chain tensioner O-ring is not worn or damaged. If worn or damaged, replace the O-ring.
4. Set the tensioner plunger onto the first tooth of the ratchet (i.e. minimum extension) by manually lifting the tensioner pawl.



Tensioner Plunger Set-up

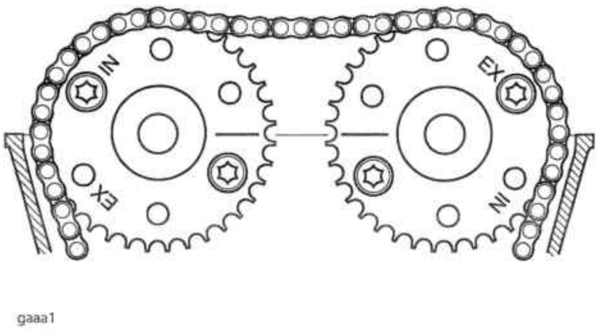
5. Fit the tensioner, complete with a new O-ring if necessary, to the cylinder head (ratchet facing upwards) and tighten the new retaining bolts to **9 Nm**.
6. Fit the sealing washer to the centre bolt. Using finger pressure only, push the ratchet section of the tensioner into firm contact with the tensioner blade. Refit the spring and centre nut to the tensioner. Tighten the centre nut to **7 Nm**.
7. Remove the cam chain tensioner blade wedge, taking care not to move or damage the tensioner blade.
8. Check that the tensioner plunger is correctly located in the middle of the cam chain tensioner blade when viewed from above.

9. Rotate the engine through 4 full revolutions, and reset number 1 cylinder to TDC. Ensure that the dot mark on the primary gear aligns with the line at the bottom of the cover.



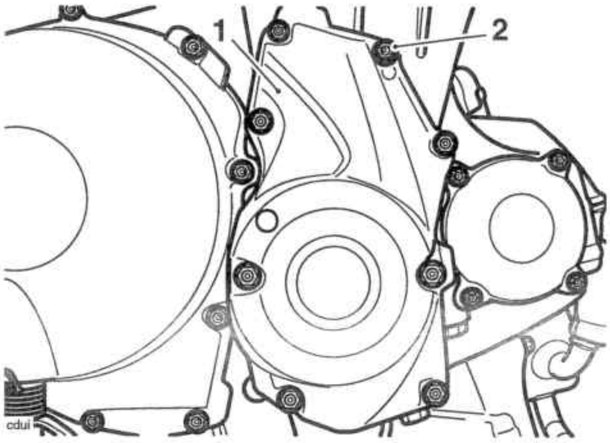
1. 'Dot' mark
2. Marker line

10. Check that the camshaft timing marks align as illustrated below.



Camshaft to Cylinder Head Alignment Marks

11. Re-check tensioner plunger location against the cam chain tensioner blade.
12. Refit the cam cover (see page *3-6*).
13. Fit a new gasket to the right hand crank cover.
14. Noting the position of the bolt fitted with the copper washer, refit the crank cover, tightening the fixings to **9 Nm**.



1. Right hand crank cover
2. Copper washer position

Camshafts

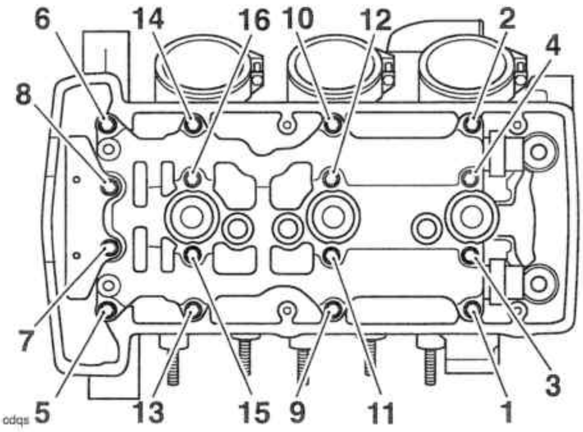
Removal

1. Remove the cam chain tensioner (see page *3-7*).

Note:

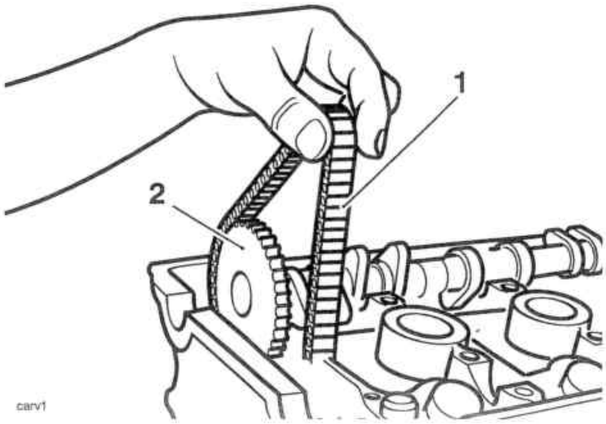
- **It is not necessary to remove the cam chain completely.**
- **Each camshaft and sprocket is removed as an assembly.**
- **Before commencing work, ensure the crankshaft dot mark is in alignment with the line in the crankcase.**

1. Note the orientation of the cam ladder in relation to the head.
2. Progressively release the bolts securing the cam ladder to the head in the sequence shown below.



Cam Ladder Bolt Release Sequence

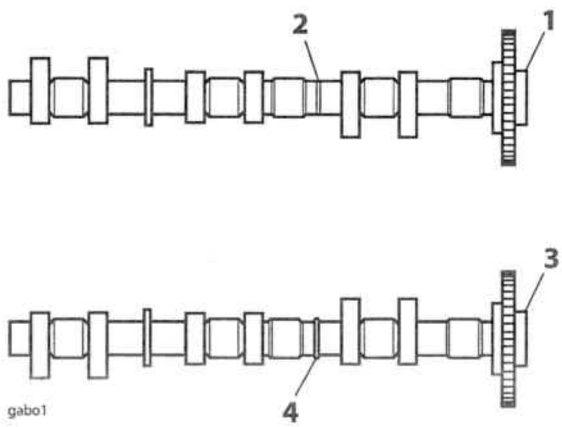
3. Remove the cam ladder and top pad, and collect the dowels (if loose) and spark plug tower O-rings.
4. Lift the cam chain from the exhaust camshaft sprocket and remove the exhaust camshaft.
5. Repeat the procedure for the inlet camshaft.



1. Cam chain
2. Inlet camshaft

Note:

- **The inlet and exhaust camshafts are different. They can be identified by a raised feature in the centre of the exhaust cam, which is machined off on the inlet cam. The camshafts can be further identified a letter 'I' for inlet or 'E' for exhaust stamped on the end of the sprocket boss.**



1. Inlet camshaft
2. Machined section
3. Exhaust camshaft
4. Raised section

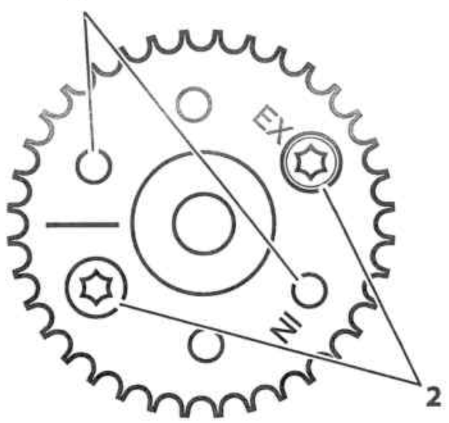
Camshaft and Bearing Cap Inspection

1. Inspect the camshaft sprockets for damaged and worn teeth. Replace as necessary.

⚠ Caution

The same sprocket is used for both inlet and exhaust camshafts. To attach the sprocket to the different camshafts, different bolt holes are used.

Never fit a camshaft sprocket to a camshaft using incorrectly identified bolt holes. Severe engine damage will result from incorrect attachment.



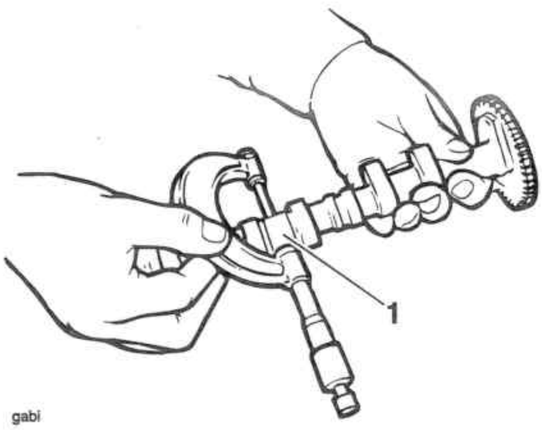
1. Inlet camshaft bolt holes

2. Exhaust camshaft bolt holes

2. Measure the camshaft journals with a micrometer. If any journal is outside the specified tolerance, replace the camshaft.

Standard Journal Diameters

Standard:	23.900 - 23.930 mm



1. Standard journal

3. Examine the camshaft and camshaft ladder for excessive wear and damage.
4. Check the journal-to-head clearances, using 'Plastigage' (Triumph part number 3880150-T0301) as follows:
5. Ensuring that the camshaft sprocket alignment marking is located as for removal, assemble one camshaft to the head and progressively tighten the cam ladder to **10 Nm**.
6. Remove the cam ladder using the bolt release sequence given earlier. Wipe the exposed areas of both the camshaft journal and a single cap area of the ladder.
   - Apply a thin smear of grease to the journal and a small quantity of silicone release agent to the cam cap area of the ladder.
   - Size a length of the Plastigage to fit across the camshaft journal. Fit the Plastigage to the camshaft journal using the grease to hold the strip in place.
   - Refit the cam ladder then evenly and progressively tighten all the cam ladder bolts to **10 Nm** in the correct sequence (see camshaft installation).
   - Release the bolts and remove the cam ladder. Using the gauge provided with the Plastigage kit, measure the width of the now compressed Plastigage.

Note:

- **The camshaft ladder is unique to each cylinder head and is, therefore, not available individually. If the camshaft ladder is worn or damaged, the complete cylinder head must be replaced.**

Measuring the Compressed Plastigage.

7. Calculate the journal clearance using the Plastigage chart supplied with the Plastigage kit.

Camshaft journal clearance

Standard:	0.070 - 0.121 mm
Service limit:	0.17 mm

8. If the clearance measured is within the specified tolerance, remove the ladder and clean off all traces of Plastigage. Assemble the camshafts (see page 3-12).

Note:

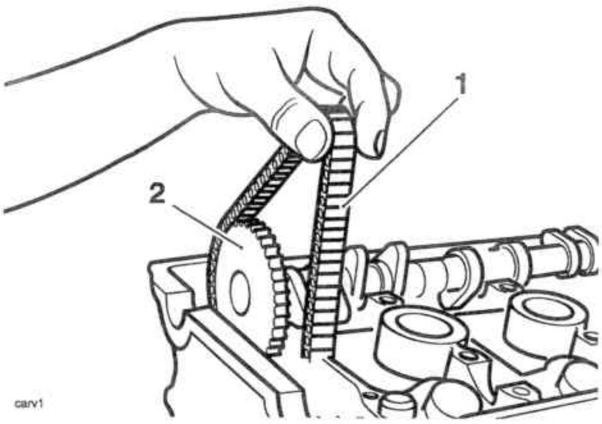
- **If the measured clearance is outside the tolerance, and the camshaft journals are within tolerance, the cylinder head must be replaced.**

Caution

Although Plastigage is oil soluble, all traces of the material must be removed to prevent blockage of the oil drillings and resultant engine damage.

Installation

1. Thoroughly clean the camshafts and journals. Inspect the ends of the camshafts for correct fitment of the sealing plugs. Lubricate the camshafts with clean engine oil before fitting to the head.
2. Locate each camshaft to the head ensuring the camshafts are correctly identified (inlet and exhaust) and are also correctly located over their respective valve banks.
3. Working on one camshaft at a time, locate the cam chain over the cam sprocket. Position the camshaft in the same position as for removal before attempting to fit the caps and ladder (that is, with the timing marks on the camshaft sprockets level and pointing inwards, and with the dot mark on the primary gear in alignment with the line on the crankcase).



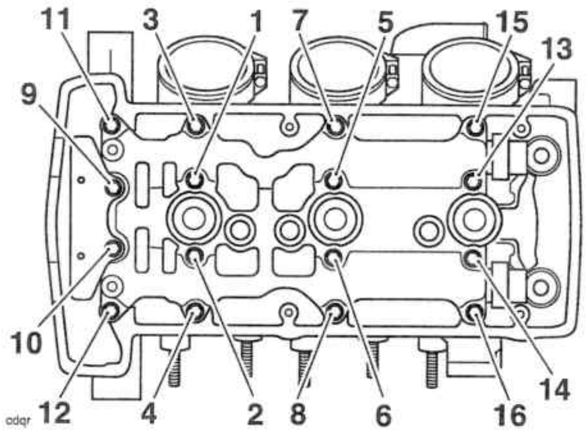
1. Cam chain
2. Inlet camshaft

4. Repeat the procedure for the other camshaft.

Caution

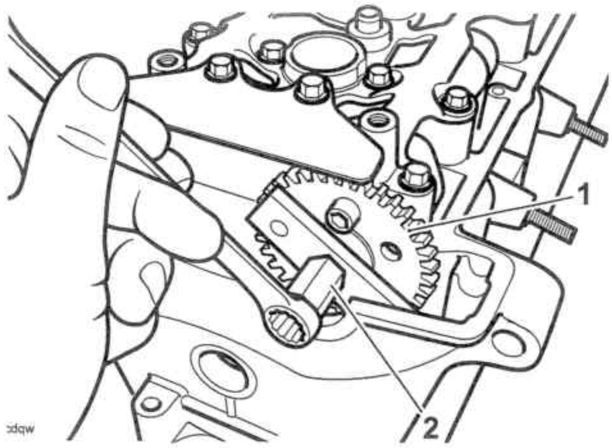
If the camshafts and ladder are fitted without first aligning the timing marks on both the crankshaft and camshaft sprockets, the inlet and exhaust valves will contact each other causing damage to both the head and the valves.

5. Lubricate the cam bearing areas of the cam ladder with a 50/50 solution of engine oil and molybdenum disulphide grease.
6. Assemble the dowels, cam ladder and top pad in the same location and orientation as prior to removal.
7. Lubricate the threads of the cam cap ladder screws with clean engine oil, and fit and evenly tighten the screws to **10 Nm**, in the sequence shown below.



Cam Cap Ladder Bolt Tightening Sequence

8. Before fitting the cam chain tensioner, ensure that each camshaft rotates freely using service tool T3880102. Do not rotate either camshaft by more than 5°.

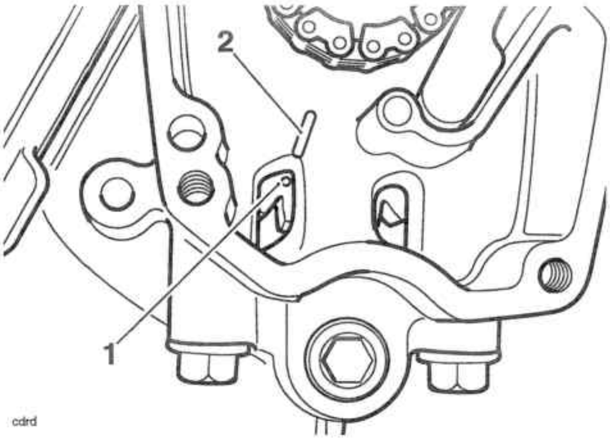


1. Exhaust camshaft
2. Tool T3880102

Caution

If any components have been renewed, the valve clearances must be checked and adjusted. Running with incorrectly adjusted valve clearances may cause excess engine noise, rough running and engine damage.

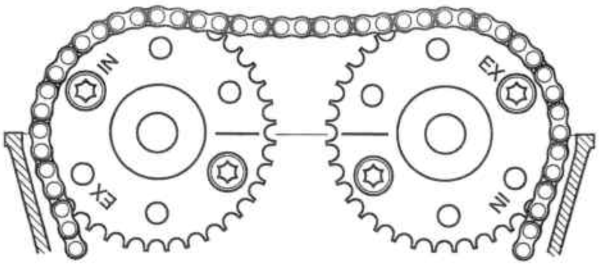
9. Assemble the cam chain tensioner using the instructions given earlier in this section.
10. Rotate the engine through 4 full revolutions, and reset number 1 cylinder to TDC. Ensure that the 'dot' mark on the primary gear aligns with the line on the crankcase.



cdrd

1. 'Dot' mark
2. Marker line

11. Check that the camshaft timing marks align as illustrated below. Rectify any misalignment before proceeding.



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Camshaft to Cylinder Head Alignment Marks

12. Check the valve clearances. Adjust as necessary (see page 3-14).
13. Refit the cam chain tensioner (see page 3-8).

Valve Clearances

Camshaft, valve, valve shim and valve seat wear affects the valve clearances. The effect of this wear is to change the gap between the camshaft and tappet bucket, 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 correctly.

Valve Clearance Measurement

Note:

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

1. Remove the cam cover (see page 3-5).
2. Remove the spark plugs to reduce compression resistance when turning the engine.
3. Select a high gear and, using the rear wheel, turn the engine until a pair of camshaft lobes are positioned pointing away from the valves.
4. Using feeler gauges, measure and record the clearances for this pair of valves only.
5. Repeat the process until the valve clearances for all valves have been checked.

NOTE:

- **If the measurement does not fall within the specified range, adjustment must be made.**

Note:

- **The correct valve clearances are in the range given.**

Inlet:	0.10 - 0.20 mm
Exhaust:	0.275 - 0.325 mm

Caution

If the valve clearances are not checked and corrected, wear could cause the valves to remain partly open, which lowers performance, burns the valves and valve seats and may cause serious engine damage.

6. Record the measured valve clearances on a chart similar to the example shown.

Typical Valve Clearance Chart

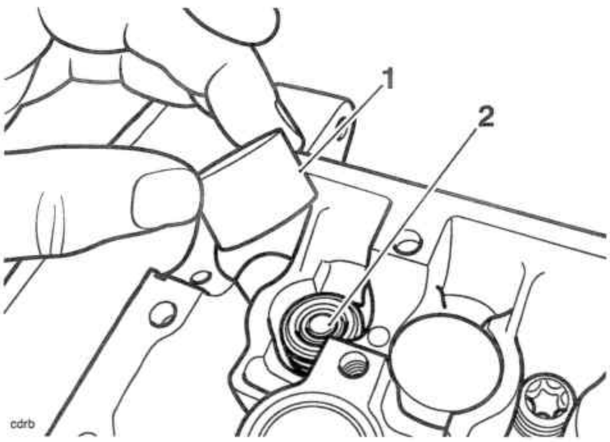
Inlet Valve No.	Gap Measured
1	as measured (mm)
2	as measured (mm)
3	as measured (mm)
4	as measured (mm)
5	as measured (mm)
6	as measured (mm)
Exhaust Valve No.	Gap Measured
1	as measured (mm)
2	as measured (mm)
3	as measured (mm)
4	as measured (mm)
5	as measured (mm)
6	as measured (mm)

Valve Clearance Adjustment

Note:

- **To adjust the valve clearances the camshafts must be removed. Follow the camshaft removal procedure.**

1. Remove the camshafts (see page *3-10*).
2. Remove the tappet bucket from the cylinder head.
3. Remove the shim from the valve head.



1. Tappet bucket
2. Shim

Note:

- **The shim may withdraw with the tappet bucket.**

4. Measure the original shim, using a micrometer and select the appropriate new shim as required.

Clearance too small:

- **Fit a thinner shim.**

Clearance too large:

- **Fit a thicker shim.**

Note:

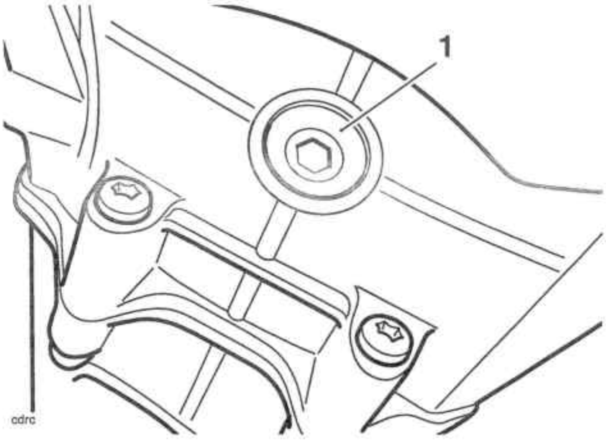
- **Shims are available ranging from 1.70 mm to 3.00 mm in increments of 0.025 mm.**

5. Fit the new shim to the valve head.
6. Lubricate the tappet bucket(s) with a 50/50 solution of engine oil and molybdenum disulphide grease.
7. Refit the tappet bucket.
8. Refit the camshafts (see page *3-12*).
9. Re-check all valve clearances.
10. Repeat the procedure if the valves require further adjustment.

Cam Chain

Removal

1. Remove the camshafts (see page *3-10*).
2. Remove the bolt from the centre of the cam chain housing in the cylinder head.



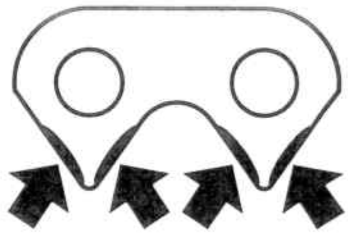
1. Centre bolt

3. Raise the front cam chain rubbing blade and detach the cam chain from the crankshaft gear.
4. The cam chain is removed from inside the head-space.

Inspection

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

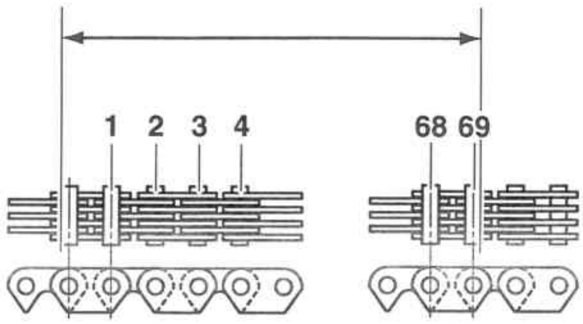
1. Check for significant blue discolouration of the chain plates indicating excessive heat build-up.
2. Examine all pins for signs of rotation.
3. Check for cracking or deep scratching of the chain plates.
4. Check for severe wear of the inner plates as indicated in the diagram below.



For a more thorough check, proceed as follows:

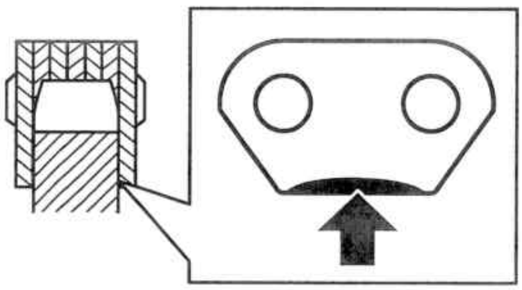
1. Remove the chain from the engine.
2. Suspend the chain from a pin or hook with a 13kg weight attached at the lower end.

3. Measure across 23 links as shown in the diagram below. If the chain is within limits, the measurement should be no longer than 147.63 mm. Measurements beyond 147.63 mm indicate that the chain must be replaced.



cajt

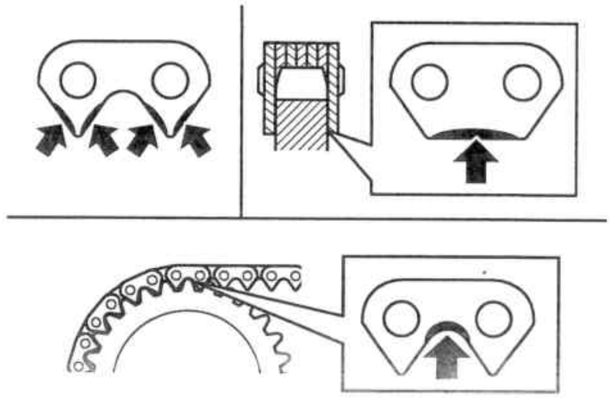
4. Check for severe wear of the inner surface of the outer plates at the side-contact points with the sprocket teeth.



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 and locate the lower end around the crankshaft gear.
2. Incorporating a new seal, refit the bolt to the centre of the cam chain housing in the cylinder head, tightening to **12 Nm**.
3. Refit the camshafts (see page *3-12*).

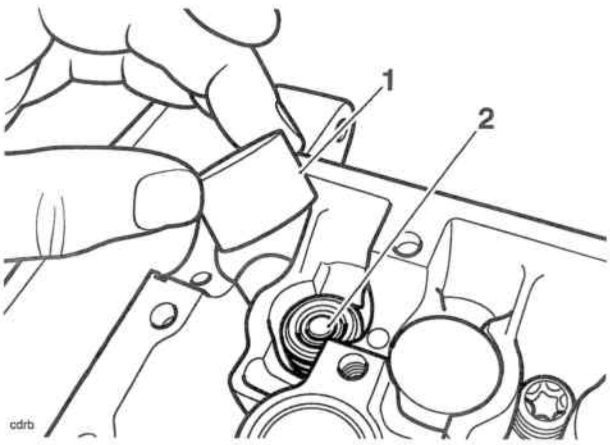
Cylinder Head

Removal

Note:

- **Removal of the cylinder head is not possible with the engine in the frame.**

1. Remove the engine from the frame (see page *9-2*).
2. Remove the camshafts (see page *3-10*).
3. Remove the cam chain (see page *3-15*).
4. Remove the cam chain tensioner blades.
5. Note the position of all tappet buckets and shims such that they can be refitted in the same positions. Remove all the tappet buckets and shims.

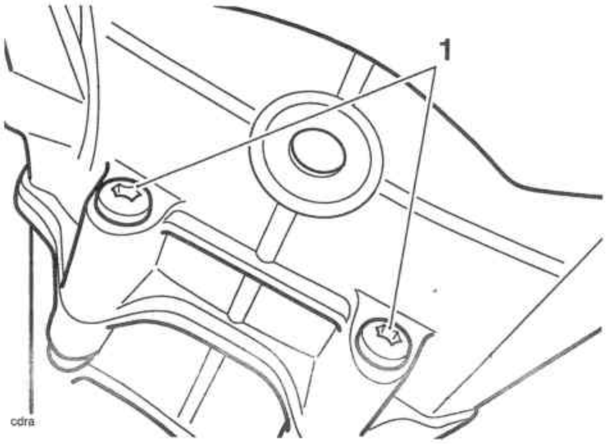


1. Shim
2. Tappet bucket

Note:

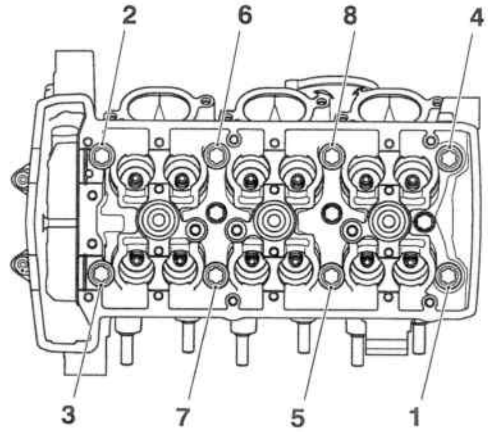
- **To prevent the tappet buckets and shims from becoming mixed, place the shim and tappet together in a marked container. The components must be refitted in their original positions.**

6. Disconnect the coolant bypass hose from the rear of the cylinder head.
7. Release the screws securing the outside of the cylinder head to the upper crankcase.



1. Cylinder head to upper crankcase screws

8. Progressively release the cylinder head bolts in the order shown below.



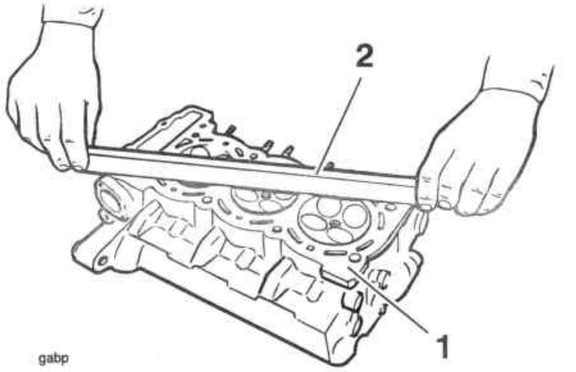
Cylinder Head Bolt Release Sequence

9. Lightly tap the cylinder head with a rubber mallet to break the seal of the gasket.
10. Remove the cylinder head. Discard the head gasket.

Cylinder Head

Inspection

1. Thoroughly clean the surface of the head and check for damage and pitting of the combustion chambers.
2. Using a straight edge, check the cylinder head gasket face for warp which could lead to gasket failure. Replace the head if warped.

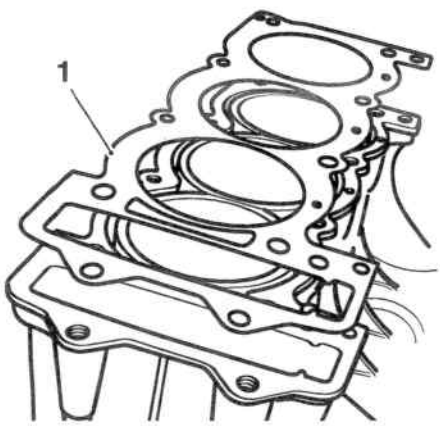


1. Cylinder head gasket face
2. Straight edge

3. Check the cam chain tensioner blades. Renew if worn or damaged.

Installation

1. Thoroughly clean the upper faces of the crankcase, taking care not to damage the mating surfaces.
2. Fit a new cylinder head gasket ensuring that the head to crankcase location dowels are correctly in place.



1. Cylinder head gasket

3. Ensure that the cylinder head face is completely clean.
4. Carefully lower the cylinder head over the cam chain and locate the head onto the dowels.

Caution

Using the correct procedure to fit and tighten the cylinder head bolts will ensure the long term reliability of the cylinder head gasket.

Clean each bolt, paying particular attention to the threads and under-bolt-head areas. If any of the threads or bolt-head areas are damaged, replace the bolt(s).

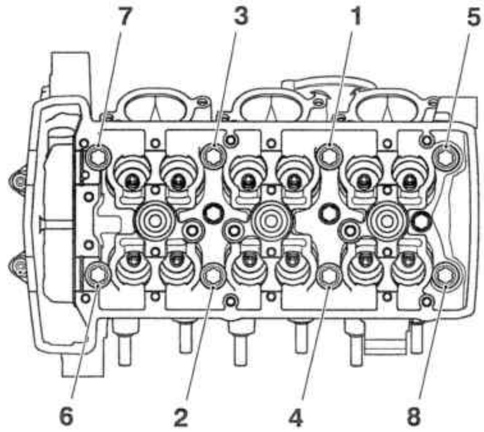
Lubricate the threads with engine oil, and then wipe clean with a lint-free cloth leaving minimal oil on the threads (that is, almost dry to touch).

Lubricate the under-bolt-head areas of the bolts with molybdenum disulphide grease.

Tighten the bolts using the three-stage procedure given below.

Failure to observe these important items may lead to engine damage through a damaged head gasket.

5. Fit the bolts to the head and tighten until finger tight.
6. The cylinder head bolts must be tightened in the following sequence:



Cylinder Head Bolt Tightening Sequence

7. The head bolts are finally tightened in three stages, all using the above sequence. This is to ensure that the cylinder head gasket seals correctly to the head and crankcase. The three stages are as follows:

Note:

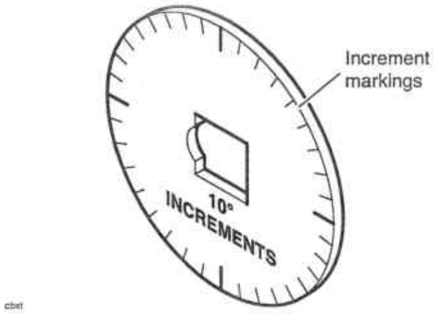
- **For stages A and B of the head bolt tightening operation, a torque wrench of known, accurate calibration must be used.**

A: Tighten the head bolts, in the sequence shown above, to 15 Nm.

B: Tighten the head bolts in the sequence shown on the previous page, to 20 Nm.

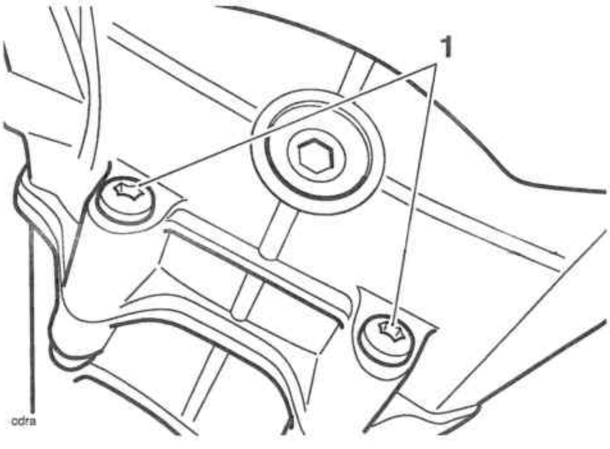
- **For the final torque operation, Stage C, (see below) which is carried out in the sequence shown on the previous page, a 'torque turn' method is used. The bolts must be turned through 120° to reach the final setting. To accurately gauge the 120° turn, use service tool 3880105-T0301 as follows:**

C: Fit the tool between the Torx socket and the drive handle and locate the Torx drive to the head bolt. Pick an increment point on the torque turn gauge which aligns with a suitable reference point on the head. Tighten the bolts until 12 of the 10° gauge increments have rotated past the chosen point on the head.



Tool T3880105-T0301

6. Fit the screws securing the side of the cylinder head to the crankcase and tighten to **10 Nm**.



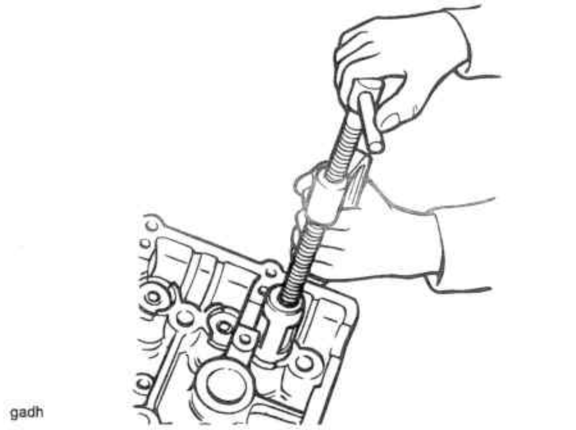
1. Cylinder head to upper crankcase screws

7. Install the cam chain tensioner blades.
8. Clean and lubricate the tappet buckets with a 50/50 solution of engine oil and molybdenum disulphide grease and refit the buckets and shims in the same locations from which they were removed.
9. Refit the cam chain (see page *3-16*).
10. Refit the camshafts (see page *3-12*).
11. Install the engine to the frame (see page *9-3*).

Valves and Valve Stem Seals

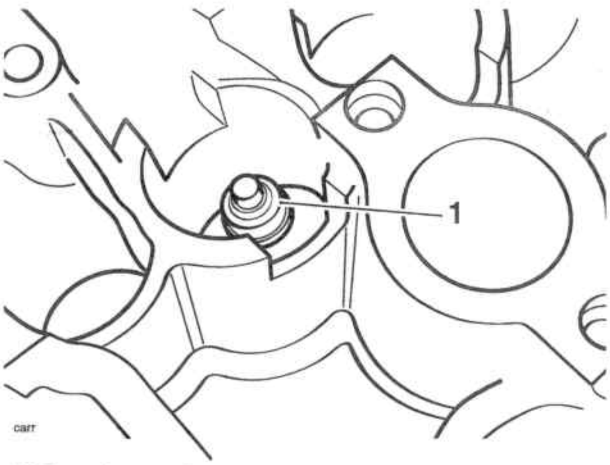
Removal from the Cylinder Head

1. Remove each valve from the head using a valve spring compressor. The compressor must act on the top cup to allow removal of the valve collets.



Valve removal

2. Once the collets are released, remove the following items:
   - valve spring retainer
   - valve spring
   - valve spring base
   - valve stem oil seal
   - valve (de-burr before removal)

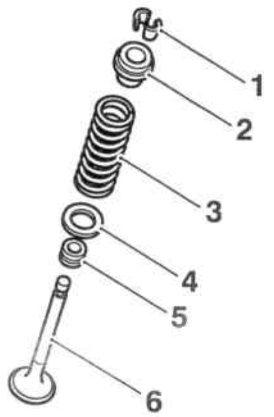


1. Valve stem seal

Cylinder Head

Note:

- **Ensure inlet and exhaust valve components do not become mixed.**



1. Collets
2. Valve spring retainer
3. Valve spring
4. Valve spring base
5. Valve stem oil seal
6. Valve

Installation

1. Lubricate the valve stems with a 50/50 solution of engine oil and molybdenum disulphide grease.
2. Install the valve into the valve guide and refit the spring base to the valve spring recess in the head.
3. Fit the valve stem seal over the valve stem and, using a suitable tool, press down fully until the seal is correctly seated over the valve guide.

Note:

- **During fitment of the valve stem seal, two distinctly different degrees of resistance will be noted when the seal is correctly fitted.**
- **Firstly, press the seal down the valve stem until the lower side of the seal comes into contact with the valve guide. Greater resistance is felt at this contact point and further gentle pressure is then required to locate the seal over the top end of the valve guide.**
- **On application of this pressure, the seal can be felt to positively locate over the top face of the valve guide. Once correctly positioned, the seal cannot be pushed down any further.**

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.

4. Install the valve spring over the valve stem. Ensure the close wound, colour coded ends of the springs are fitted downwards (towards the piston).
5. Compress the valve spring ensuring that the spring is compressed squarely to prevent damage to the valve stem and cylinder head.
6. Fit the valve collets ensuring correct collet location in the spring retainer and valve as the spring compressor is released.

Caution

Always check for correct location of the valve collets during and after assembly. If not fitted correctly, the collets may become dislodged when the engine is running allowing the valves to contact the pistons. Any such valve to piston contact will cause severe engine damage.

Valve to Valve Guide Clearance

If the valve guides are worn beyond the service limit given below, the cylinder head must be replaced.

Valve Stem to Guide Clearance

Inlet:	0.010 - 0.040 mm
Service limit	0.078 mm

Exhaust:	0.030 - 0.060 mm
Service limit	0.098 mm

Valve Guides

If a valve guide is found to be worn beyond the service limit, the complete cylinder head must be renewed.

Valve Face Inspection

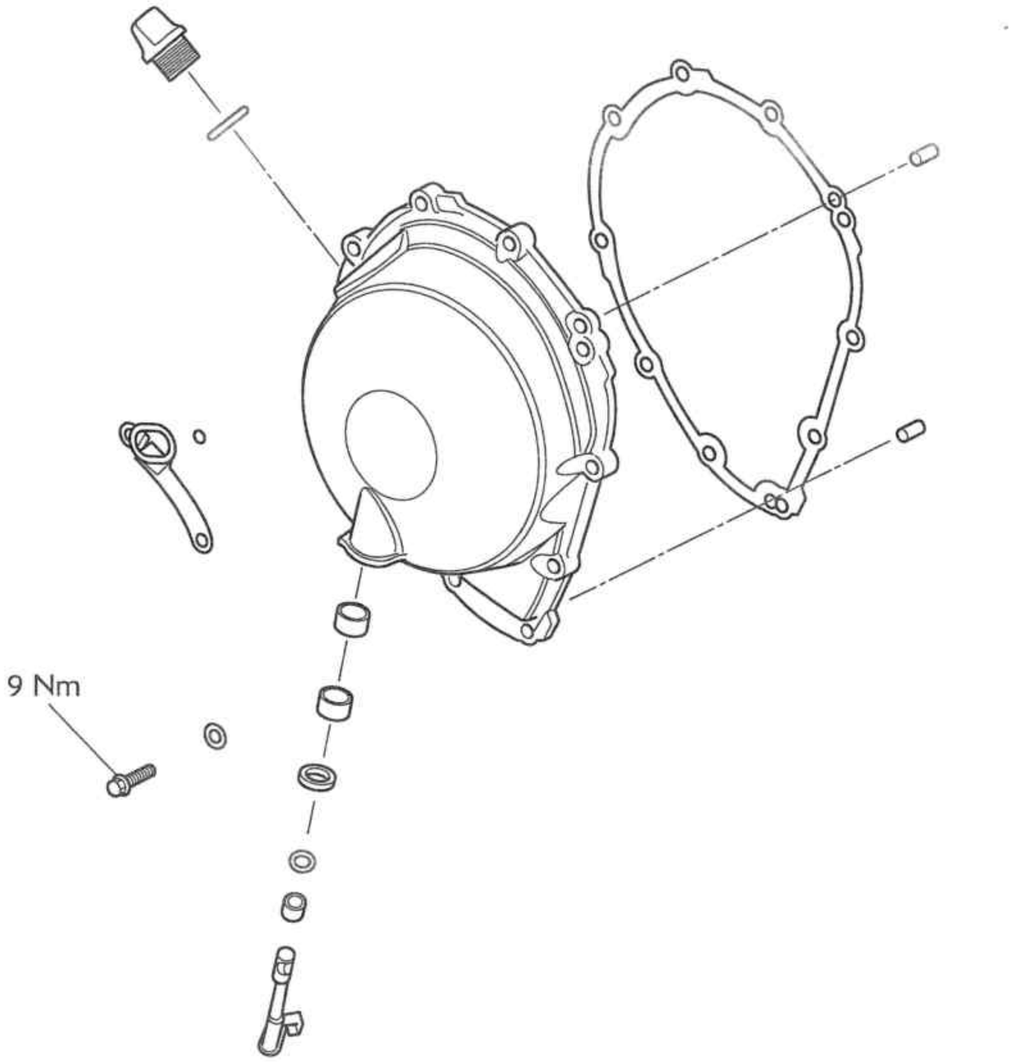
1. Remove any carbon build-up from the valve head area. Examine the valve seat face, checking in particular for signs of cracking or pitting.

4 Clutch

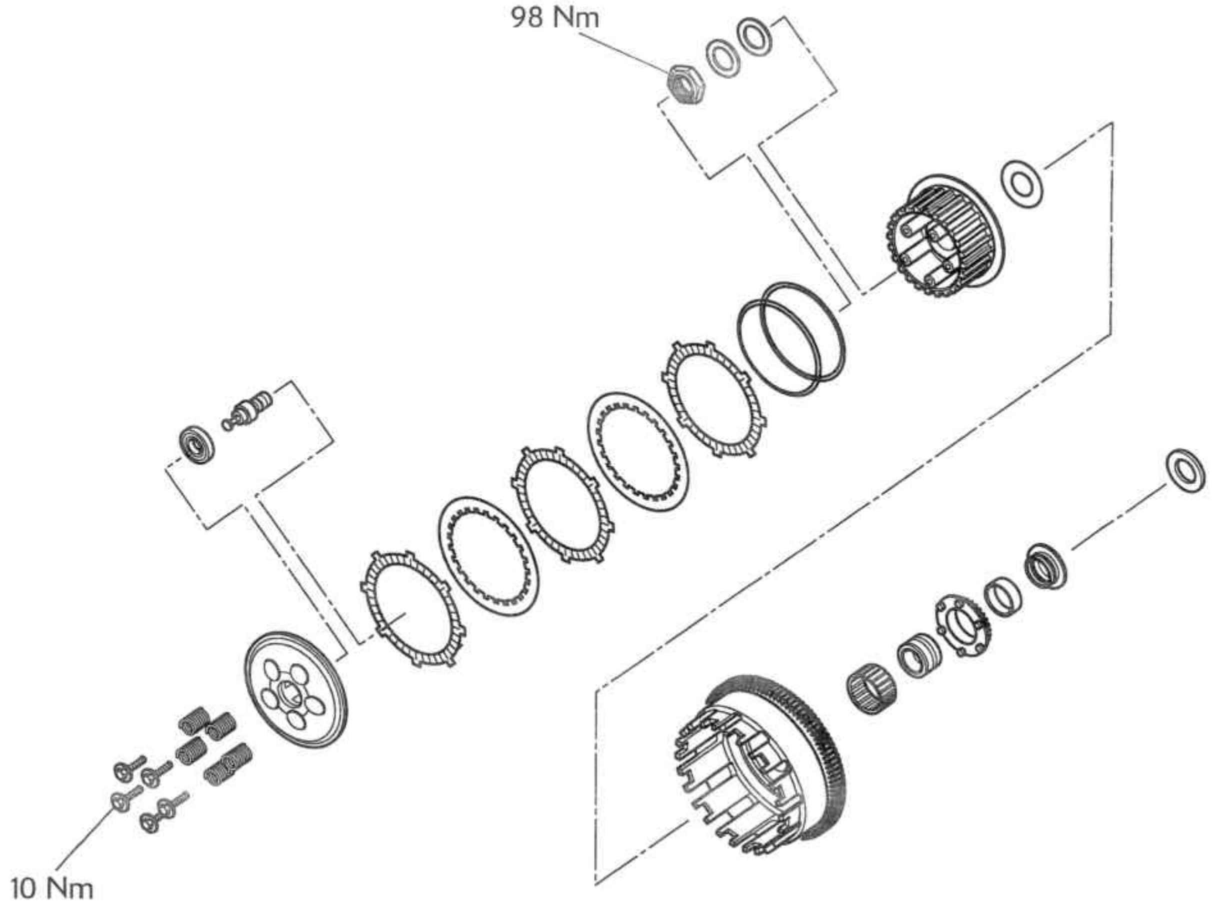
Table of Contents

Clutch

Exploded View - Clutch Cover

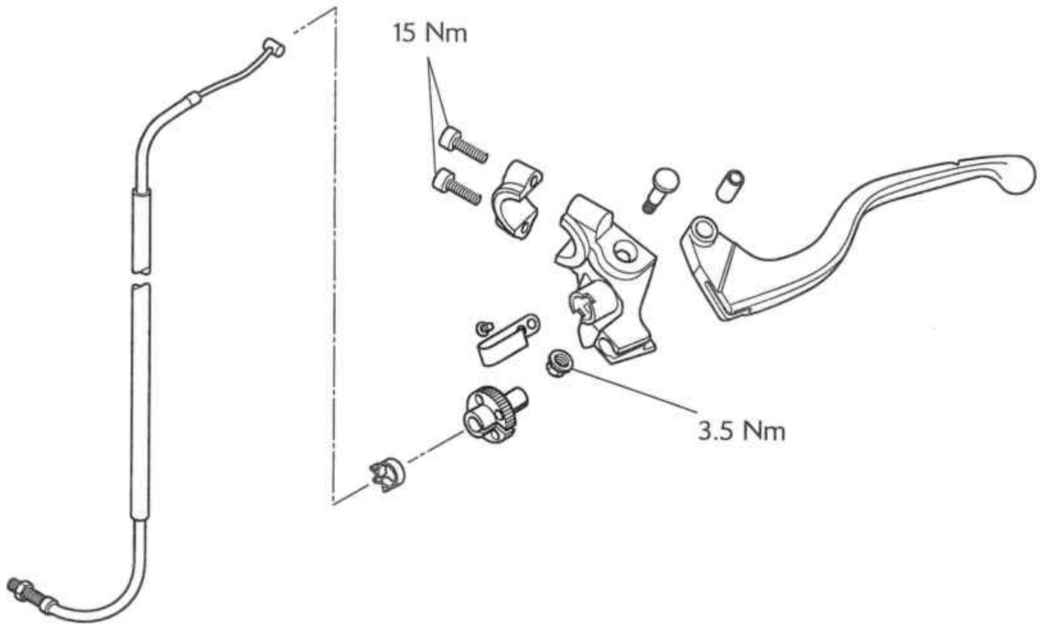


Exploded View - Clutch Assembly



Clutch

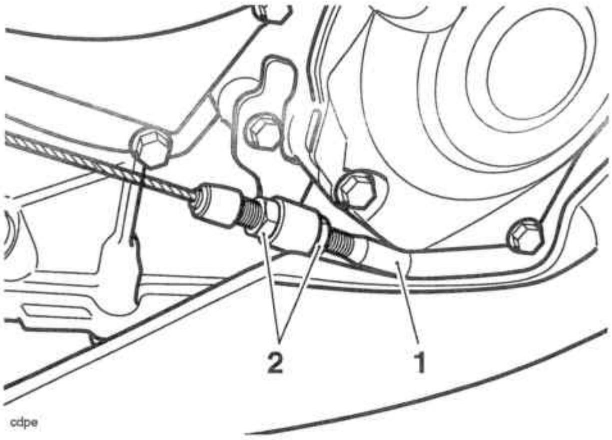
Exploded View - Clutch Controls



Clutch Cable

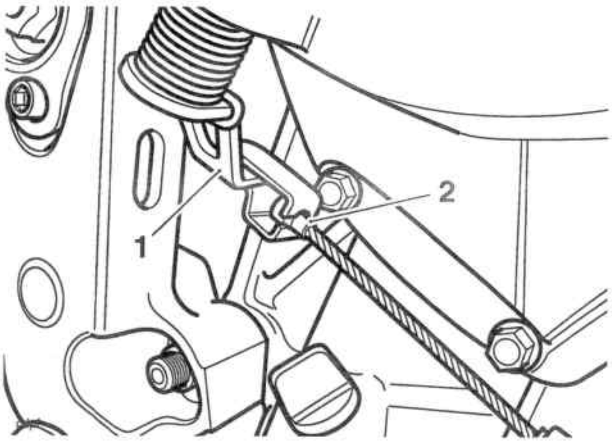
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Slacken the cable locknut and release the adjuster at the clutch cover end to give maximum play in the cable.



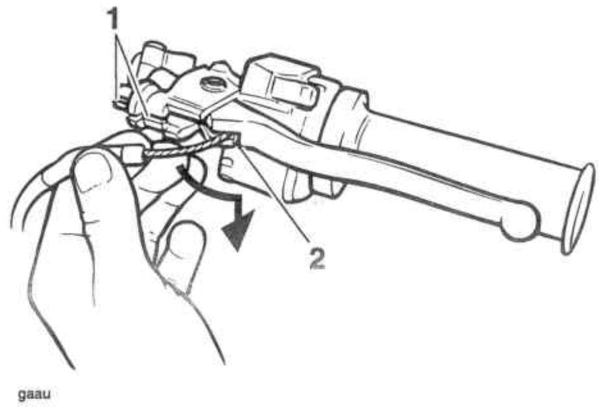
1. Clutch cable
2. Adjuster

4. Release the clutch cable from the actuating arm by pushing the inner cable nipple through the arm and sliding the cable out of the slot. Detach the cable from the bracket.



1. Actuating arm
2. Inner cable nipple

5. Align the cable adjuster and lever bracket slots.
6. Pull in the clutch lever and turn the inner cable, anti-clockwise through the slots in the adjuster and locknut, until the cable can be detached from the lever by pushing downwards.



1. Cable adjuster/lever bracket slots
2. Cable release point

7. Remove the cable from the motorcycle noting the cable routing.

Inspection

1. Check the inner cable for free movement through the outer cable.
2. Examine the inner cable for frayed strands.
3. Examine the two inner cable nipples for signs of looseness and damage. Replace the cable if necessary.

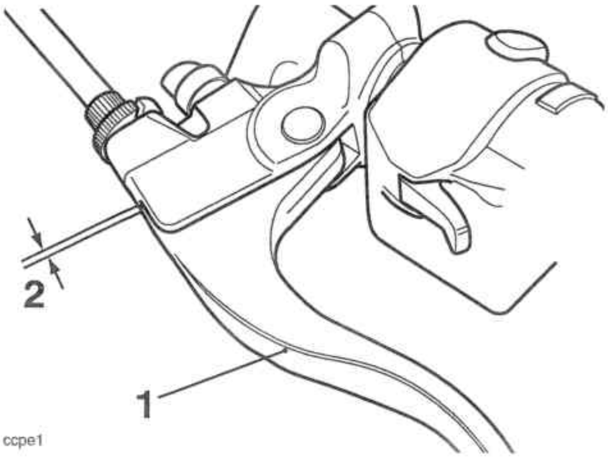
Assembly

1. Position the cable to the motorcycle using the same routing as noted during removal.
2. Attach the inner cable to the clutch lever and actuating arm using a reversal of the removal process.
3. Refit the outer cable to the adjuster bracket at the clutch end.

Note:

- **Ensure that the two adjuster nuts are positioned one either side of the bracket.**

4. Set the lever adjuster to a point where an equal adjustment is possible in both directions.
5. Set the adjuster at the clutch end to give a preliminary setting of 2-3 mm of free play as measured at the lever. Tighten the locknut.
6. Operate the clutch lever several times and recheck the amount of free-play present.
7. Set the final adjustment of the cable to give 2-3 mm of free-play at the lever by turning the adjuster nut and locknut at the lever end.



ccpe1

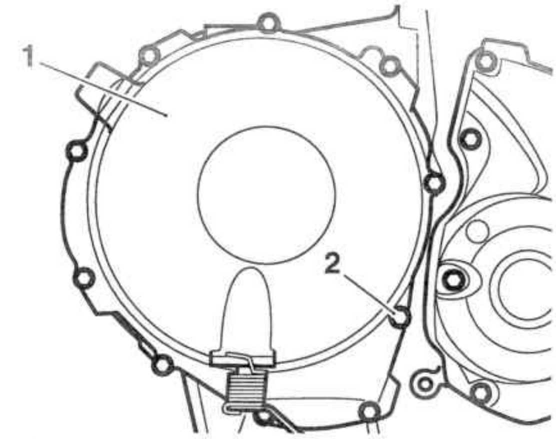
1. Clutch lever
2. Correct setting, 2-3 mm

8. Reconnect the battery, positive (red) lead first.
9. Refit the rider's seat (see page *16-11*).

Clutch

Disassembly

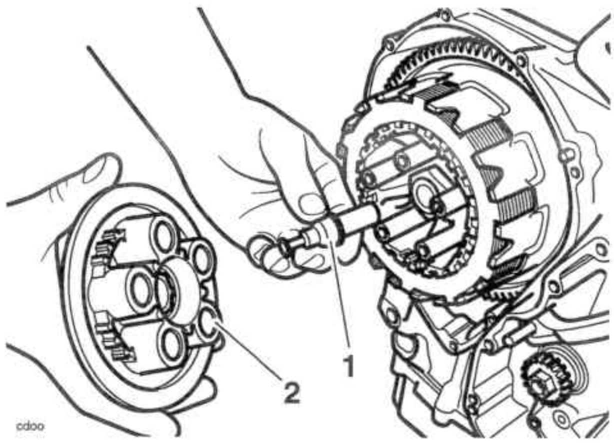
1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the lower fairings (see page *16-13*).
4. Release the clutch cable from the actuating arm (see page *4-5*).
5. Remove the clutch cover, noting the copper washer position. Discard the clutch cover gasket.



cdpd

1. Clutch cover
2. Copper washer position

6. Undo the bolts and remove the springs and clutch pressure plate.
7. Remove the clutch pull-rod.



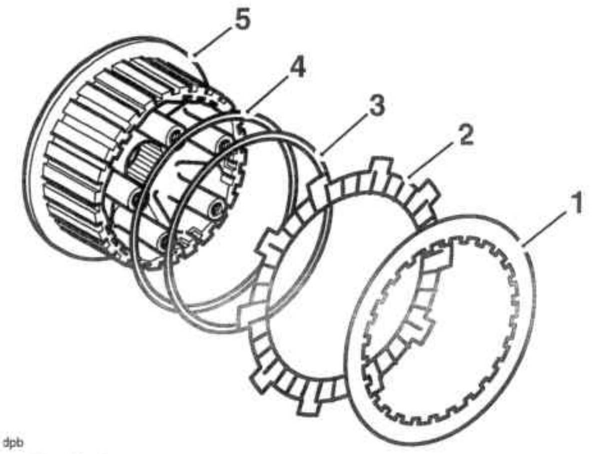
cdoo

1. Clutch pull-rod
2. Clutch pressure plate

8. Remove the clutch friction plates and steel plates together with the anti-judder spring and anti-judder seat washer.

Note:

- **Record the orientation of all components as they are removed. The plates must be assembled in the same order.**



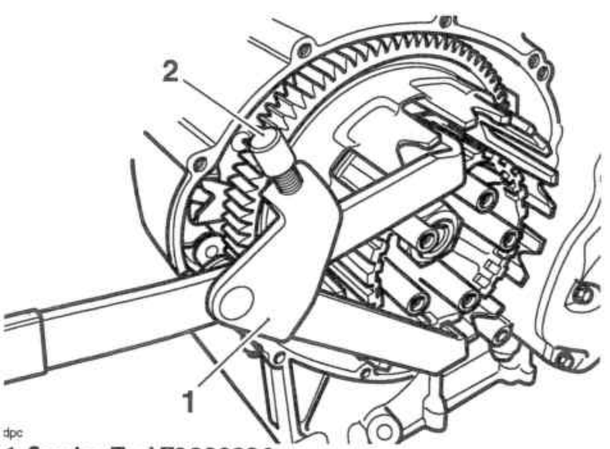
dpb

1. Steel plate
2. Inner fiction plate
3. Anti-judder spring
4. Anti-judder seat washer
5. Clutch inner drum

Note:

- **The innermost friction plate differs from all others and must not be fitted in any other position. It can be identified by its larger inner diameter and it is also darker in colour.**
- **Refer to the following page of this section for details of clutch friction plate checking.**
- **It is not normally necessary to disassemble the clutch further, but if the clutch inner and outer drums are to be removed, proceed as follows:**

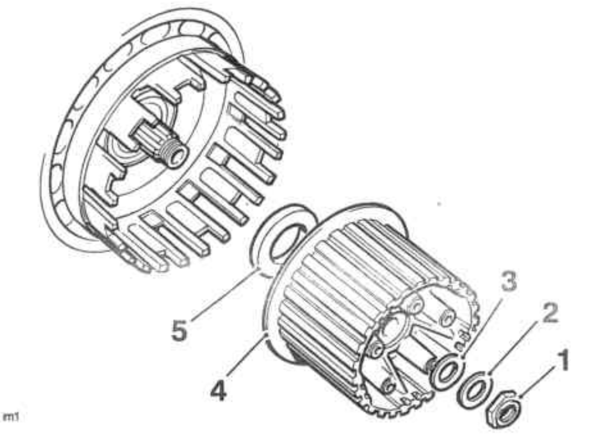
9. Insert service tool T3880026 into the splines of the clutch inner drum. Using finger pressure only, tighten the adjuster screw to allow the tool to grip the splines. Do not overtighten the adjuster screw.



dpc

1. Service Tool T3880026
2. Adjuster screw

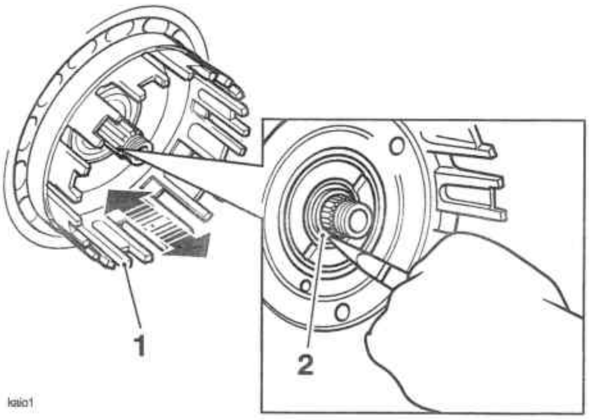
10. Retain the service tool to prevent the clutch inner drum from turning, then release the centre nut. Remove the tool.
11. Remove the centre nut, Belleville washer, flat washer, clutch inner drum and thrust washer.



m1

1. Centre nut
2. Belleville washer
3. Flat washer
4. Inner drum
5. Thrust washer

12. Slide the clutch outer drum assembly gently backwards and forwards to dislodge the inner bearing sleeve. Carefully remove the bearing sleeve while supporting the clutch drum.



kaio1

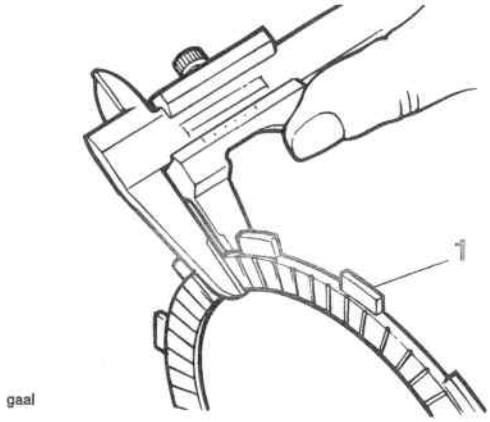
1. Outer drum
2. Bearing sleeve

13. Remove the clutch outer drum leaving the oil pump drive sprocket, bearing and sleeve in place on the input shaft.

Friction Plate Inspection

Thickness

1. If any friction plate thickness is outside the service limit, replace the friction plates as a set.



1. Clutch friction plate

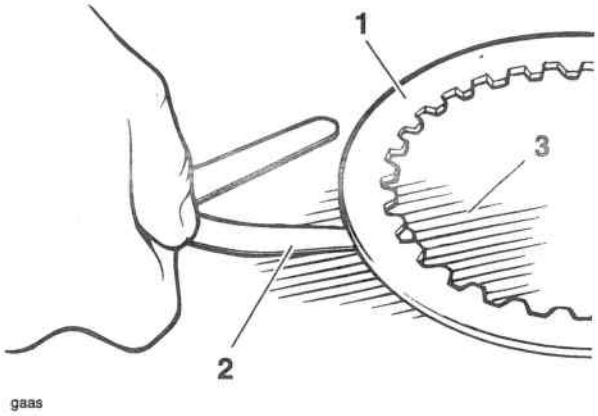
Friction plate thickness - all plates

Standard	3.00 mm
Service limit	2.80 mm

Bend/warp

Check all plates for bend and warp as follows:

1. Place the plate being checked on a clean surface plate and attempt to pass a feeler gauge of the maximum specified thickness between the friction plate and surface plate at several points around the plate. If the feeler gauge can be passed beneath the friction plate at any point, renew the plates as a set.



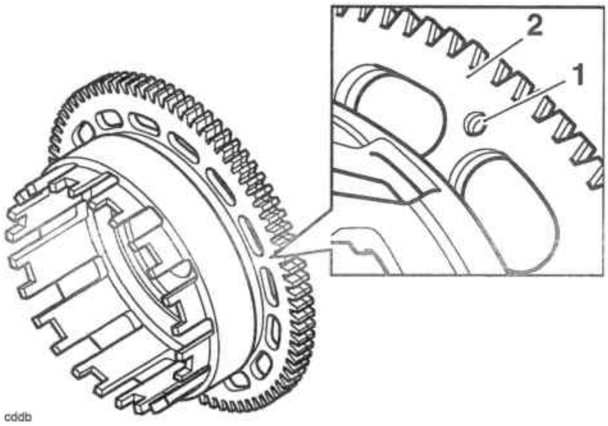
1. Friction plate
2. Feeler gauge
3. Surface plate

Friction plate bend/warp

Standard	up to 0.15 mm
Service limit	0.20 mm

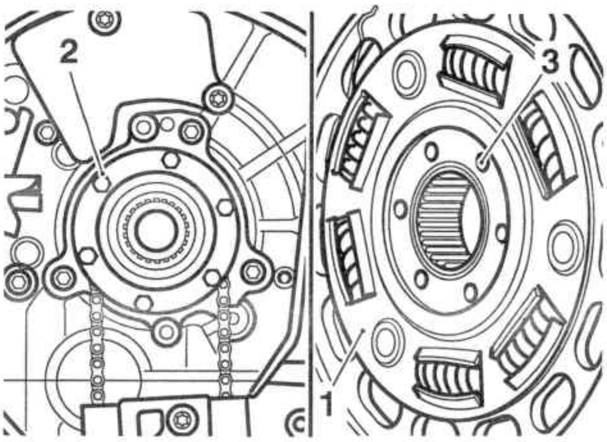
Assembly

1. To fully engage the outer drum, insert a suitable tool to preload and align the primary gear and backlash eliminator gear through the hole shown in the illustration below.



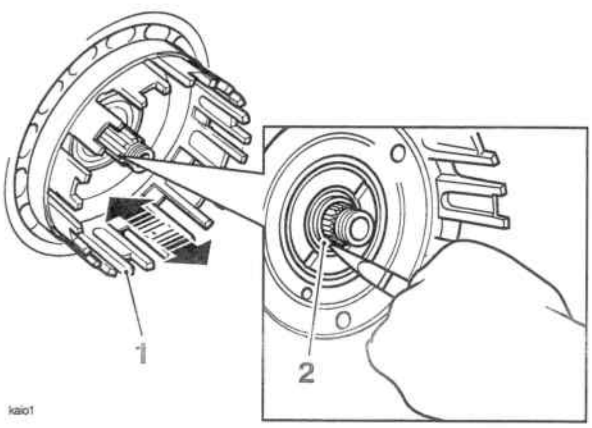
1. Alignment hole
2. Outer drum

2. Position the clutch outer drum assembly to the input shaft and align the oil pump drive pegs with the corresponding holes in the rear of the clutch outer drum.



1. Clutch outer drum
2. Oil pump sprocket drive pegs
3. Oil pump drive holes

3. While holding the clutch outer drum in position and ensuring correct engagement with the oil pump drive, refit the bearing sleeve and bearing.

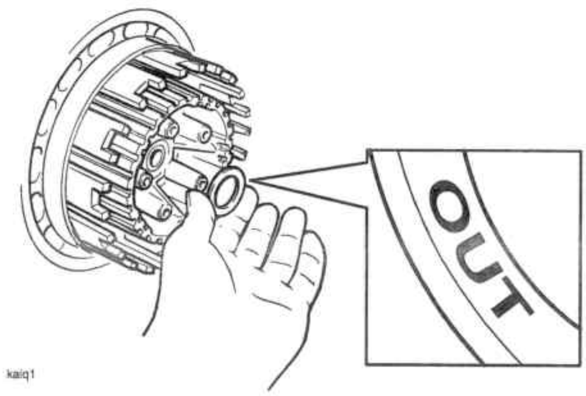


1. Outer drum
2. Bearing sleeve

Note:

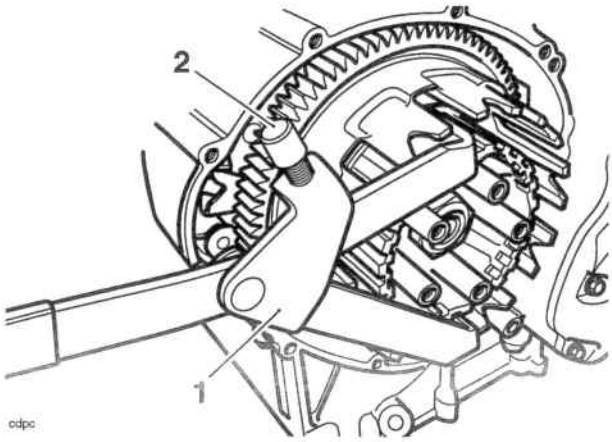
- **When the bearing sleeve is correctly fitted, it will be a flush fit with the clutch drum face.**

4. Fit the thrust washer to the shaft.
5. Fit the clutch inner drum.
6. Fit the flat washer, a new Belleville washer ('OUT' mark facing outwards), and refit the centre nut.



Belleville Washer 'OUT' Mark

7. Using service tool T3880026, prevent the clutch inner drum from turning, and tighten the clutch centre nut to **98 Nm**. Remove the service tool.

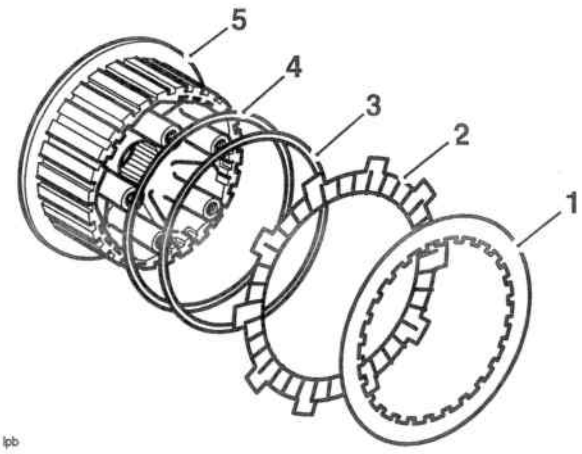


1. Service tool T3880026

8. Coat all clutch friction plates in clean engine oil before fitting the friction plates, steel plates, anti-judder spring and anti-judder seat washer to the clutch basket in the same order and orientation as noted during removal.

Note:

- **The innermost friction plate differs from all others and must not be fitted in any other position. It can be identified by its larger inner diameter and it is also darker in colour.**



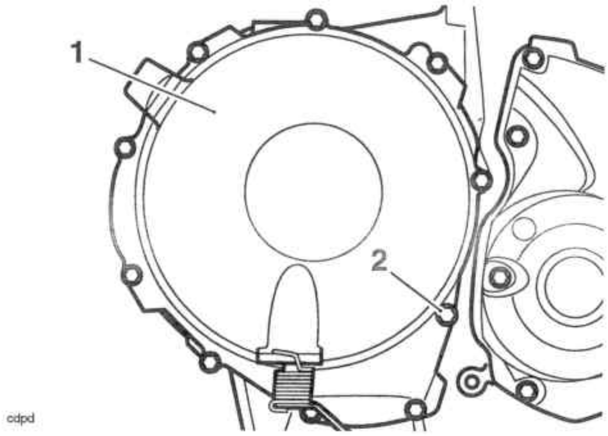
1. Steel plate
2. Inner fiction plate
3. Anti-judder spring
4. Anti-judder seat washer
5. Clutch inner drum

9. Refit the clutch pull-rod.
10. Refit the clutch pressure plate together with the springs and bolts. Tighten the bolts to **10 Nm**.

Note:

- **The pull-rod should be free to move in and out and also it should be free to turn.**

11. Clean and refit the clutch cover incorporating a new gasket. Install the bolt with the copper washer in the position shown below. Tighten the clutch cover bolts to **9 Nm**.



1. Clutch cover
2. Copper washer position

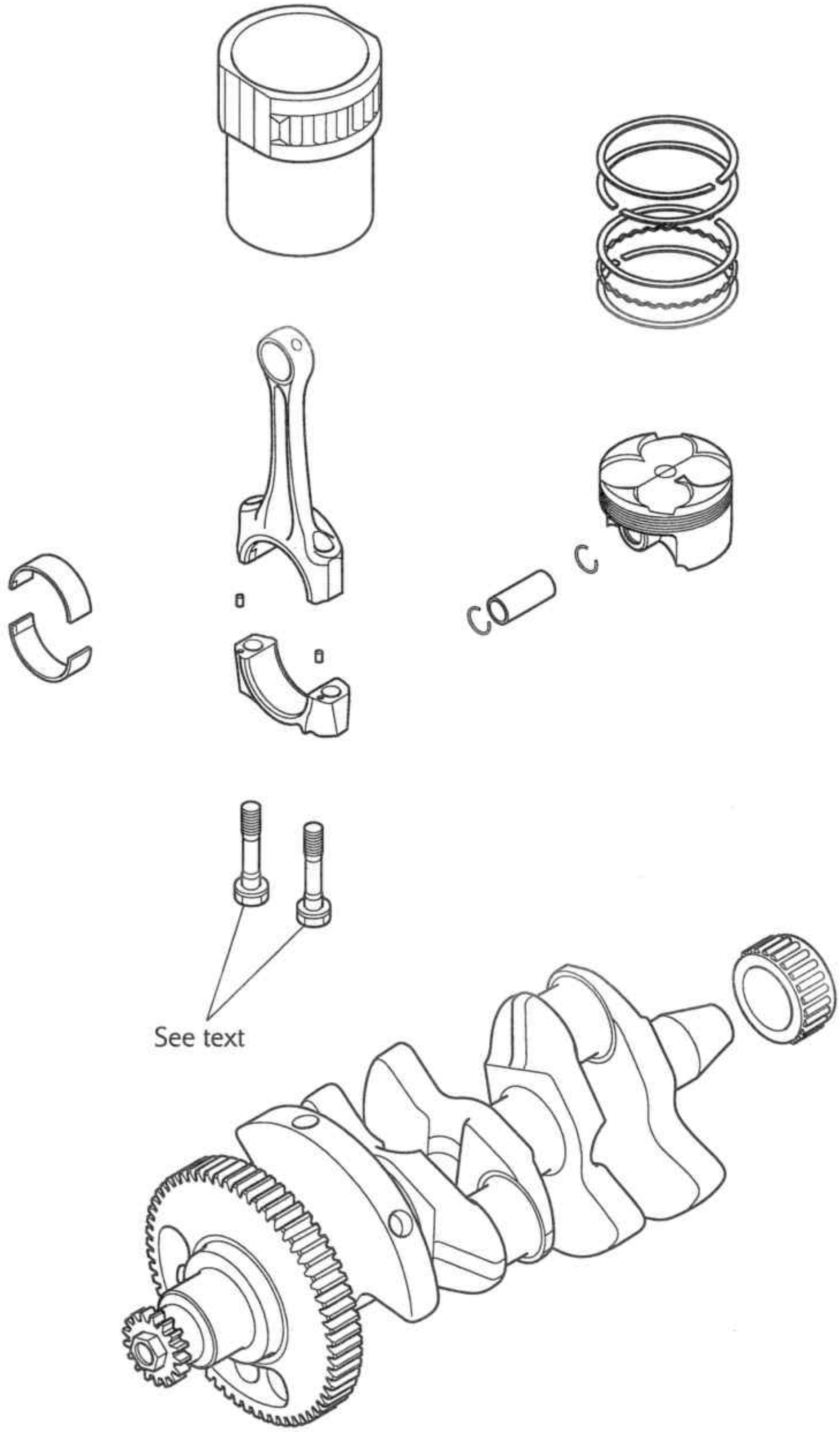
12. Refit the outer cable to the adjuster bracket at the clutch end (see page *4-6*).
13. Set the clutch adjustment (see page *4-6*).
14. Refit the lower fairings (see page *16-14*).
15. Reconnect the battery positive (red) lead first.
16. Refit the rider's seat (see page *16-11*).

5 Crankshaft, Connecting Rods and Pistons

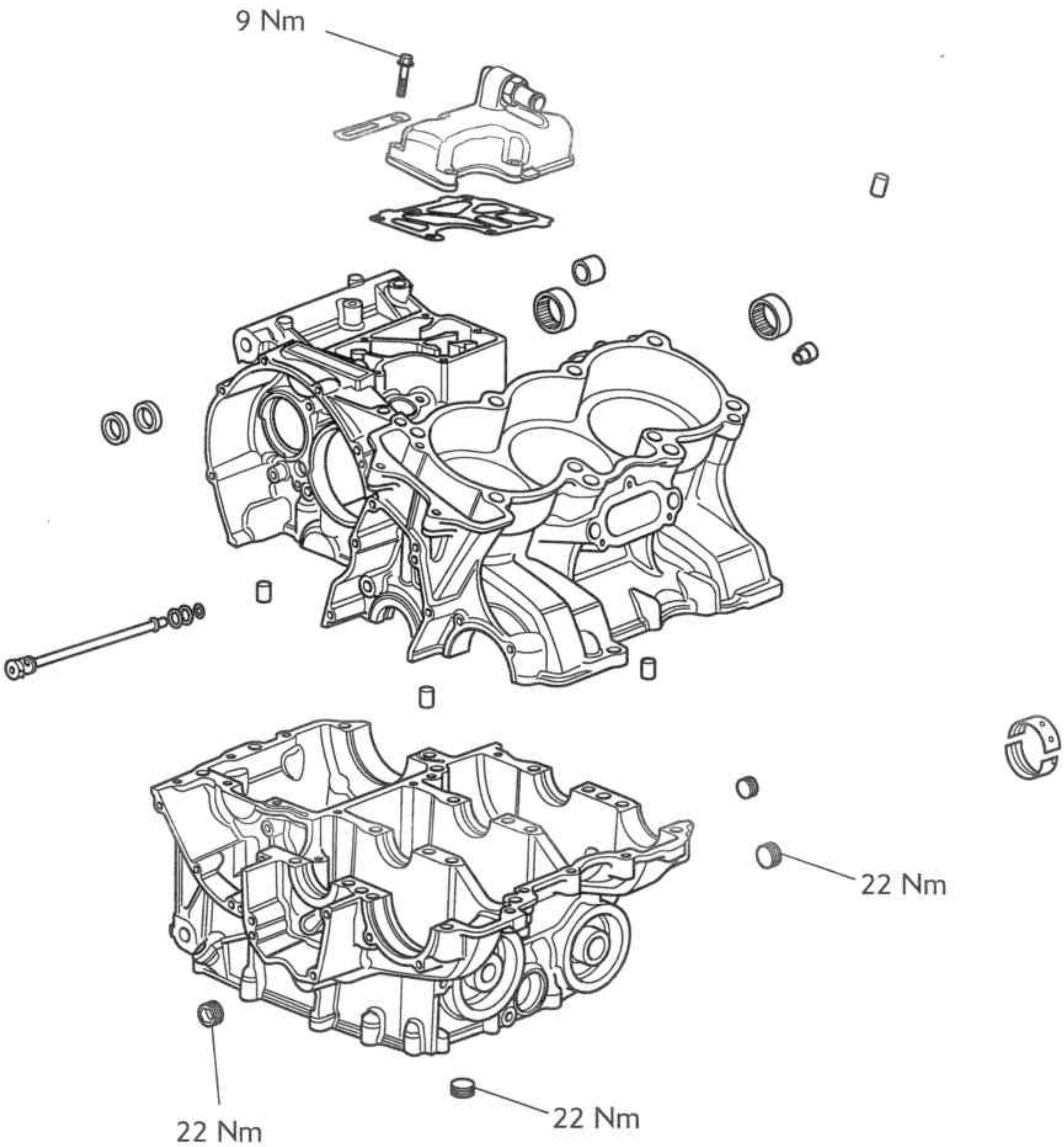
Table of Contents

Crankshaft, Connecting Rods and Pistons

Exploded View - Crankshaft, Connecting Rod, Piston and Liner



Exploded View - Crankcase



Crankcases

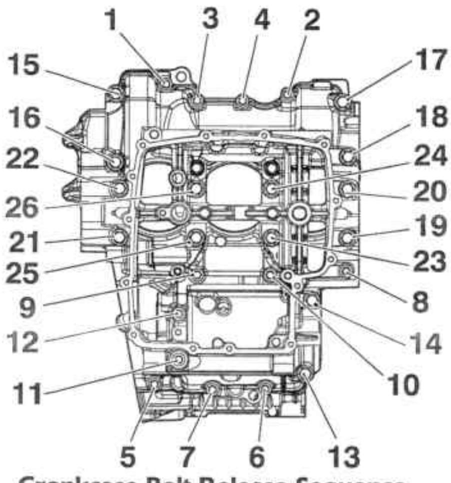
> **⚠ Caution**
>
> The upper and lower crankcases are machined as a matched set and must never be assembled to non-matching halves. Doing so may cause seizure of the engine.

1. Remove the engine from the frame (see page *9-2*).
2. Remove the sump (see page *8-15*).
3. Remove the engine covers (see page *7-21*).
4. Remove the clutch (see page *4-5*).
5. Remove the oil pump (see page *12-6*).

Disassembly

> **⚠ Caution**
>
> Failure to follow the correct screw release sequence may result in permanent crankcase damage.

1. Invert the engine to give access to the lower crankcase bolts.
2. Release the lower crankcase bolts in the sequence shown in the diagram below.



Crankcase Bolt Release Sequence

3. Separate the lower and upper crankcases ensuring that the 3 locating dowels remain in the upper crankcase.

> **⚠ Caution**
>
> Do not use levers to separate the upper and lower sections of the crankcase or damage to the crankcases could result.

Note:

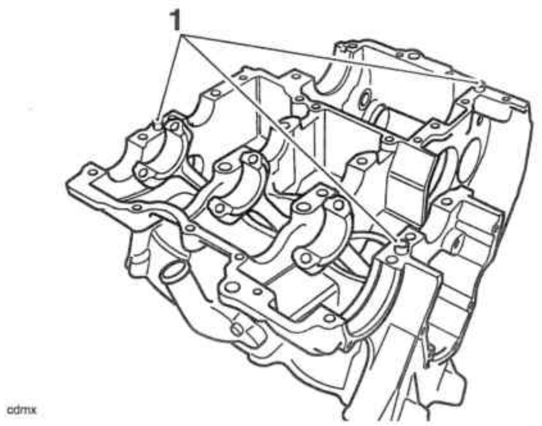
- **At this point the transmission shafts, balancer, crankshaft, bearings etc. can be removed.**

Note:

- **The position of each individual bearing shell prior to removal.**
- **Collect the piston cooling jets from below the upper main bearings.**

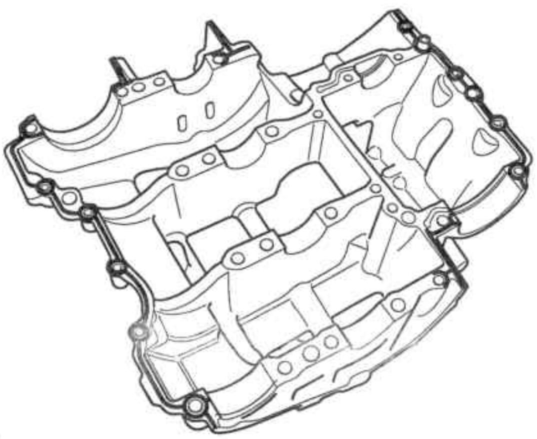
Assembly

1. Use high flash-point solvent to clean the crankcase mating faces. Wipe the surfaces clean with a lint-free cloth.
2. Fit the gearbox shafts (if removed), ensuring the locating ring and dowels on the output shaft bearings are in positioned correctly in the crankcase.
3. Ensure that the transmission is in neutral.
4. Ensure that the 3 locating dowels are in position in the upper crankcase.



1. Locating dowels

5. Apply a thin bead of silicone sealant (At the factory, ThreeBond 1215 is used) to the lower crankcase mating faces.

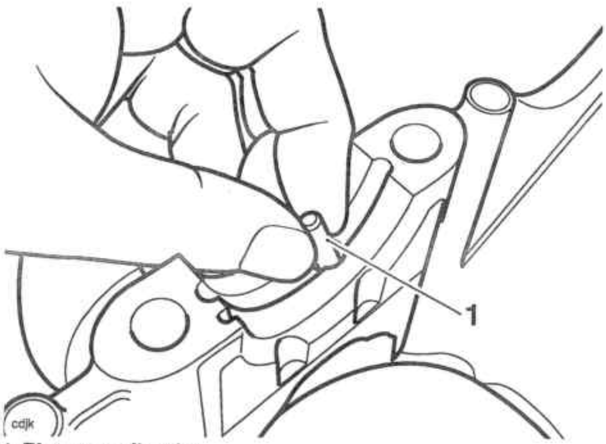


Sealer areas

Caution

Do not use excessive amounts of sealer. The extra sealer may become dislodged and could block the oil passages in the crankcases causing severe engine damage.

6. If removed, insert the three piston cooling jets into the main bearing housings in the upper crankcase.



1. Piston cooling jet

Caution

Ensure the three piston cooling jets are installed. If the piston cooling jets are omitted, oil pressure will be reduced. Running the engine with low oil pressure will cause severe engine damage.

Note:

- **The piston cooling jet for number 3 cylinder is longer and has a larger diameter drilling than the piston cooling jets for number 1 and 2 cylinders. It can also be identified by its smaller outside diameter and a groove around its circumference. Piston cooling jets cannot be installed incorrectly.**

7. Install and lubricate the crankshaft bearing shells with clean engine oil (see bearing selection before proceeding).
8. Lubricate the crankshaft journals with clean engine oil.
9. Position the lower crankcase to the upper. An assistant may be required to support the crankcase during alignment.
10. Fit the screws into the lower crankcase and hand tighten until the bolt heads are near contact with the crankcase.

Note:

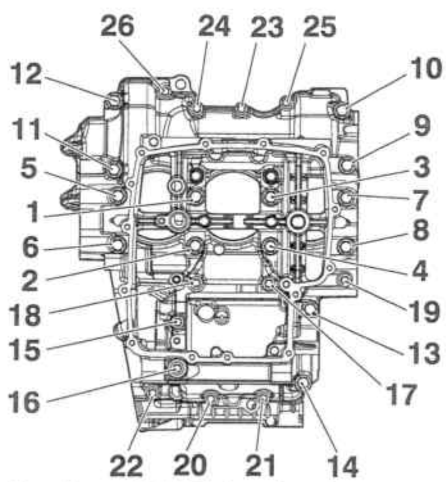
- **The crankcase screws are tightened in stages.**
- **Two different sizes of crankcase screw are used. All screws are tightened through the first stage of the tightening procedure but only the M8 size screws are tightened at the second stage.**

Caution

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

Stage 1 - all screws

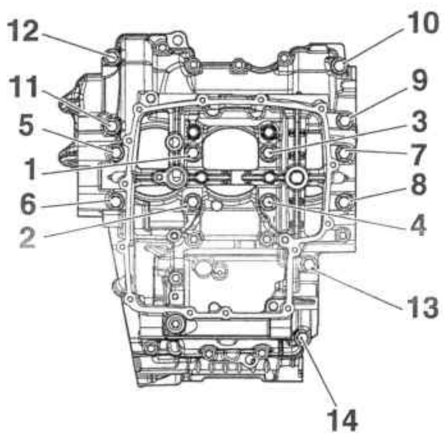
1. In the sequence shown below, tighten all crankcase screws to **12 Nm**.



Crankcase Bolt Tightening Sequence

Stage 2 - M8 screws only

1. In the correct sequence, tighten only the M8 size crankcase screws (numbers 1 to 8) to **28 Nm**.
2. In the correct sequence, tighten only the M8 size crankcase screws (number 9 to 14) to **28 Nm**.



M8 Crankcase Bolt Tightening Sequence

3. Rotate the crankshaft clockwise. Check for tight spots and rectify as necessary.
4. Refit the oil pump (see page *12-14*).
5. Refit the clutch (see page *4-6*).
6. Refit the engine covers (see page *7-22*).
7. Refit the sump (see page *0-0*).
8. Install the engine in the frame (see page *9-3*).

Crankshaft

Removal

1. Remove the alternator rotor from the crankshaft (see page *17-16*).
2. Separate the two halves of the crankcase (see page *5-4*).
3. Remove the connecting rods (see page *5-7*).
4. Remove the cam chain (see page *3-15*).
5. Release and remove the crankshaft from the upper crankcase.

Note:

- **Identify the location of each bearing shell.**
- **Remove all bearings and inspect for damage, wear, overheating (blueing) and any other signs of deterioration. Replace the bearings as a set if necessary.**
- **Collect the piston jets from below the main upper bearings**

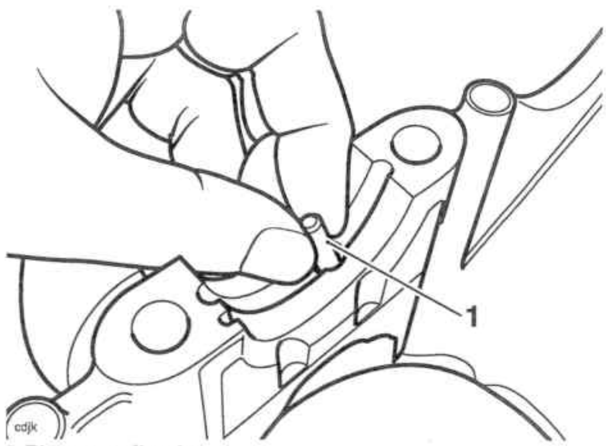
6. Remove the balancer (see page *6-3*).

Installation

Caution

Always check the bearing journal clearance (see page *5-12*), before final assembly of the crankshaft. Failure to correctly select crankshaft bearings will result in severe engine damage.

1. If removed, insert the three piston cooling jets into the main bearing housings in the upper crankcase.



1. Piston cooling jet

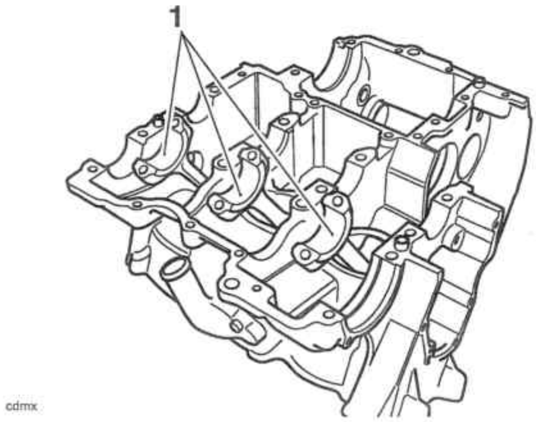
Caution

Ensure the three piston cooling jets are installed. If the piston cooling jets are omitted, oil pressure will be reduced. Running the engine with low oil pressure will cause severe engine damage.

Note:

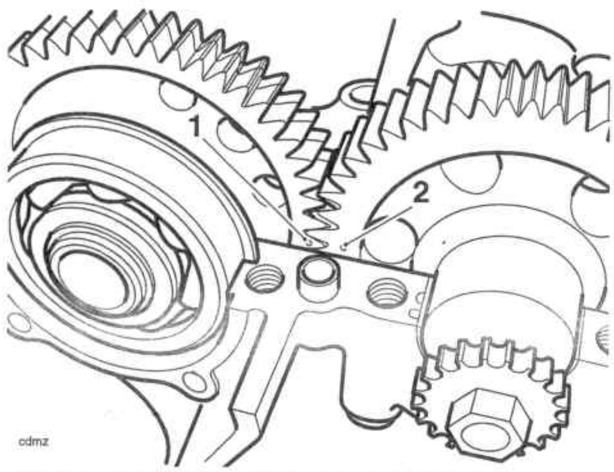
- **The piston cooling jet for number 3 cylinder is longer and has a larger diameter drilling than the piston cooling jets for number 1 and 2 cylinders. It can also be identified by its smaller outside diameter and a groove around its circumference. Piston cooling jets cannot be installed incorrectly.**

1. Select and fit new main and big end shell bearings using the selection processes detailed later in this section.



1. Big end shells

2. Lubricate all bearings with a 50/50 solution of engine oil and molybdenum disulphide grease.
3. Ensure that the crankshaft is clean, and that the oilways within the crank are clean and free from blockages and debris.
4. Refit the balancer (see page 6-4).
5. Install the crankshaft ensuring that the crank pins align with the big ends and that the crankshaft and balancer gear markings align as shown in the next illustration.



1. Balancer backlash and drive gear markings
2. Crankshaft markings

6. Refit the connecting rods (see page 5-8).
7. If removed, refit the transmission shafts.
8. Assemble the crankcases (see page 5-4).
9. Assemble the alternator rotor (see page 17-19).
10. Assemble the cam chain (see page 3-16).

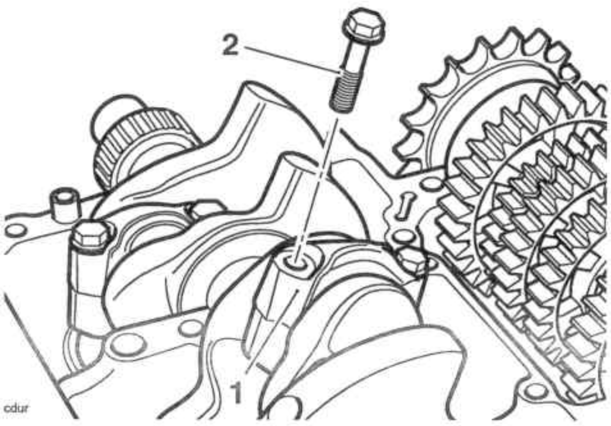
Connecting Rods

Removal

Connecting rods may be removed from the engine after first removing it from the frame. The cylinder head must be removed and the crankcase halves separated.

1. Mark each big end cap and connecting rod to identify both items as a matched pair and to identify the correct orientation of the bearing cap to the connecting rod.

2. Release the connecting rod bolts and remove the big end cap. Ensure that the bearing shell remains in place in the cap.



1. Big end cap
2. Connecting rod bolt

Note:

- **It may be necessary to gently tap the big end cap with a rubber mallet to release the cap.**

3. Push the connecting rod up through the crankcase and collect the piston and connecting rod from the top.
4. Label the assembly to identify the cylinder from which it was removed.

Caution

Never re-use connecting rod bolts. If the connecting rod cap is disturbed, always renew the bolts. Using the original bolts may lead to severe engine damage.

5. Remove the liner using tool T3880101 (see page *5-16*).
6. Detach the piston from the connecting rod (see page *5-13*).

Installation

Note:

- **Connecting rod bolts are treated with an anti-rust solution which must not be removed.**
- **Clean the connecting rod with high flash-point solvent.**
- **Remove all bearings and inspect for damage, wear and any signs of deterioration and replace as necessary.**

Warning

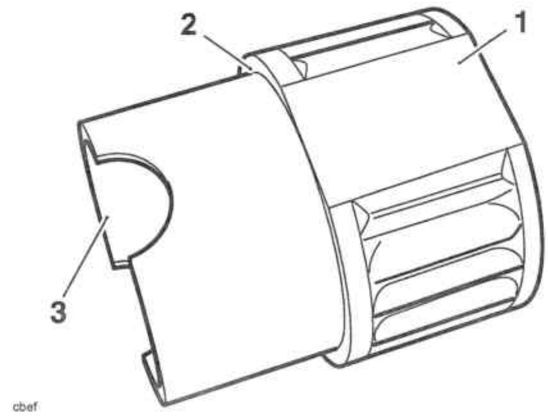
Connecting rod bolts MUST only be used once. If the bolts are removed or undone for any reason, new bolts MUST always be used.

Re-using bolts can cause connecting rods and their caps to detach from the crankshaft causing severe engine damage, loss of motorcycle control and an accident.

Note:

- **Ensure the piston is fitted correctly to the connecting rod.**
- **If a previously run engine is being rebuilt, always ensure that the piston and con-rod are assembled in the same orientation, and to the same cylinder, as prior to strip-down.**

1. Apply silicone sealer to the liner-to-crankcase mating face (At the factory, Three Bond 1215 is used).

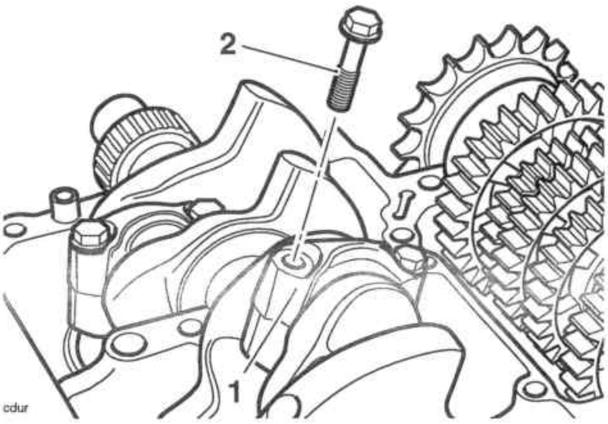


1. Liner
2. Sealer area

2. Fit the piston and connecting rod assembly into the liner from the bottom.
3. Fit the liner into the crankcase ensuring that the arrow/dot on the piston faces forward.

Note:

- **Ensure that the piston/liner/connecting rod assembly aligns correctly with the crankpin during assembly into the crankcase.**



1. Big end cap
2. Connecting rod bolt

4. Select the big end bearing shells (see page 5-10).
5. Fit the bearing shells to the connecting rod and big end cap and lubricate with a 50/50 solution of engine oil and molybdenum disulphide grease.
6. Align the connecting rod to the crankshaft and fit the big end cap.

Caution

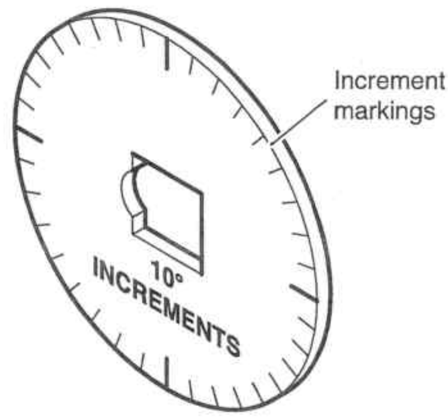
The torque characteristics of the connecting rod bolts are sensitive to the correct lubrication being applied. If the threads and under head areas are not lubricated with molydenum disuplhide grease, the bolts may be stretched and may become loose when in service resulting in an expensive engine failure.

7. Lubricate the threads and under-head area of the new bolts with molybdenum disulphide grease. Tighten the bolts progressively in two stages as follows:

Caution

The torque characteristics of the connecting rod bolts are sensitive to the rate at which they are tightened. If all the torque is applied in one action, the bolt may be stretched and may become loose when in service resulting in an expensive engine failure.

a) Tighten to **14 Nm**.
b) Tighten through 90° of bolt rotation as measured using the Triumph torque turn gauge 3880105-T0301.



Service Tool 3880105-T0301

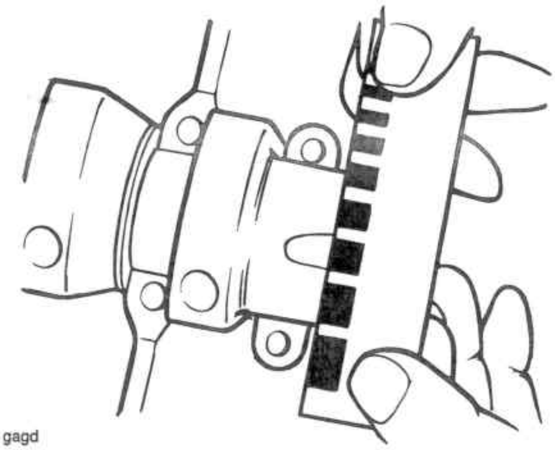
Connecting Rod Big End Bearing Selection/Crankpin Wear Check

1. Measure the bearing and crankpin clearance as follows.

Note:

- **The crankpin clearances are measured using 'Plastigage' (Triumph part number 3880150-T0301).**
- **Do not turn the connecting rod and crankshaft during the clearance measurement as this will damage the 'Plastigage'.**

2. Remove the big end cap from the journal to be checked.
3. Wipe the exposed areas of the crankpin, and the bearing face inside the cap.
4. Apply a thin smear of grease to the journal and a small quantity of silicone release agent to the bearing.
5. Trim a length of the Plastigage to fit across the journal. Fit the strip to the journal using the grease to hold the Plastigage in place.
6. Release the bolts and remove the cap being measured. Using the gauge provided with the Plastigage kit, measure the width of the compressed Plastigage.
7. Lubricate the threads and under-head of the bolt with molybdenum disulphide grease. Refit the bearing and cap and tighten the big end bolts (see page 5-9).



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Checking the Measured Clearance

Con rod big end bearing/crankpin clearance

Standard:	0.035 - 0.065 mm
Service limit:	0.070 mm

Note:

- **If the measured clearance exceeds the service limit, measure the crankpin diameter.**

Crankpin diameter

Standard:	32.984 - 33.000 mm
Service limit:	32.960 mm

Note:

- **If any crankpin has worn beyond the service limit, the crankshaft must be replaced. Due to the advanced techniques used during manufacture, the crankshaft cannot be reground and no oversize bearings are available.**

Connecting Rod Bearing Selection

Minor differences in crankshaft dimensions are compensated for by using selective bearings. For further information on bearing part number to colour cross-references, see the latest parts information.

1. Select the correct big end bearing shell as follows:
   - **Measure each crankpin diameter.**
   - **Select the correct bearings by matching the information found with the chart below.**

Note:

- **All dimensions in millimeters.**

Big end bearing selection chart

Shell Colour	White	Red
Con-rod Big End Bore Dia.	36.008 36.000	36.008 36.000
Crankpin Dia.	33.000 32.992	32.991 32.984
Running Clearance	0.065 0.035	

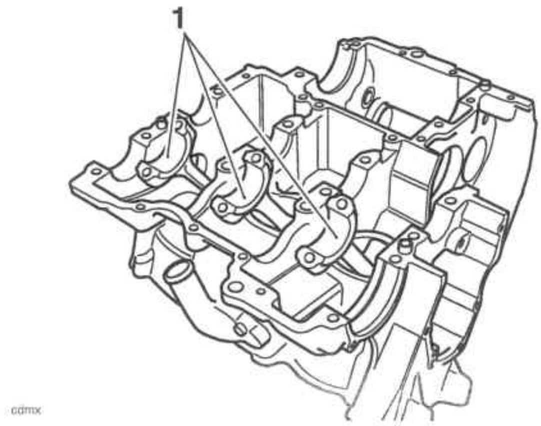
For instance:

Con-rod Big End Diameter	36.002
Crankpin Diameter	32.987
Required Bearing	Red

Note:

- **Repeat the measurements for all connecting rods and their respective crankpins.**
- **It is normal for the bearings selected to differ from one connecting rod to another.**

2. Install the new bearings in the connecting rod.



1. Big end bearings

> **⚠ Caution**
>
> Always confirm, using the Plastigage method, that the running clearance is correct before final assembly. Severe engine damage could result from incorrect clearance.

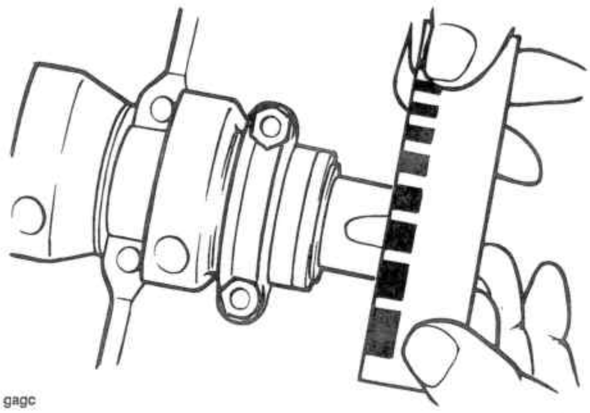
Crankshaft, Connecting Rods and Pistons

Crankshaft main bearing/journal wear

Main Bearing Selection Chart (all dimensions in millimeters)						
Shell Colour	White	Red	Red	Blue	Blue	Green
Crankcase Bore	35.982 35.973	35.981 35.973	35.989 35.981	35.988 35.981	35.997 35.989	35.997 35.989
Journal Dia.	33.000 32.993	32.992 32.984	33.000 32.993	32.992 32.984	33.000 32.993	32.992 32.984
Running Clearance	0.044 0.020	0.044 0.020	0.043 0.021	0.043 0.020	0.043 0.020	0.044 ·0.020

Minor differences in crankshaft and crankcase dimensions are compensated for by using selective bearings. For further information on bearing part number to colour cross-references, see the latest parts microfiche.

- **Measure the bearing to crankshaft main journal clearance using Plastigage (Triumph part number 3880150-T0301) (see page** ***5-9*****).**



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Checking Crankpin Clearance using Plastigage

Crankshaft main bearing/journal clearance

Standard:	0.020 - 0.044 mm
Service limit:	0.07 mm

If the clearance exceeds the service limit, measure the diameter of the crankshaft main journal.

Crankshaft main journal diameter

Standard:	32.984 – 33.000 mm
Service limit:	32.960 mm

Note:

- **If any journal has worn beyond the service limit, the crankshaft must be replaced. Due to the techniques used during manufacture, the crankshaft cannot be reground and no oversize bearings are available.**

Select bearings as follows:

1. Measure and record the diameter of each crankshaft main bearing journal.
2. Measure and record each main bearing bore diameter in the crankcase (bearings removed).

Compare the data found with the chart above to select bearings individually by journal.

For example:

Crankshaft Journal diameter	32.995 mm
Crankcase Bore	35.997 mm
Bearing Required	Blue

Note:

- **It is normal for the bearings selected to differ from one journal to another.**
- **It is also normal for there to be two options of bearing shell colour. In such cases, pick the shell size which gives the greater running clearance.**

Caution

Always confirm, using the Plastigage method, that the running clearance is correct before final assembly. Severe engine damage could result from incorrect clearance.

Crankshaft End Float

Standard	0.15 - 0.30 mm

Note:

- **Crankshaft end float is controlled by the tolerances in crankshaft and crankcase machining. No thrust washers are used. If the crankshaft end float is outside the specified limit, the crankshaft and/or the crankcases must be replaced.**

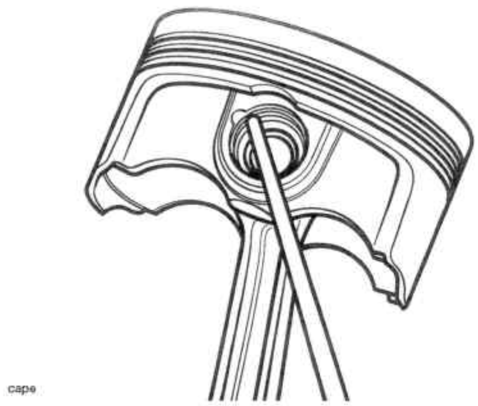
Pistons

Disassembly

Note:

- **It is not necessary to remove the connecting rods from the crankshaft.**

1. Remove the cylinder head (see page *3-17*).
2. Remove the liner, using the frame from tool T3880315, and tool T3880101 (see page *5-16*).
3. Remove and discard the gudgeon pin circlip from one side of the piston.



Removing the Gudgeon Pin Circlip

4. Remove the gudgeon pin by pushing the pin through the piston and rod toward the side from which the circlip was removed.

⚠ Caution

Never force the gudgeon pin through the piston. This may cause damage to the piston which may also damage the liner when assembled.

Note:

- **If the gudgeon pin is found to be tight in the piston, check the piston for a witness mark caused by the circlip. Carefully remove the mark to allow the pin to be removed.**

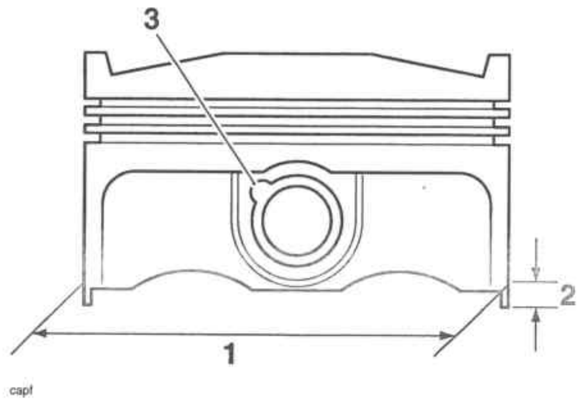
5. Piston rings must be removed from the piston using hand pressure only. Do not over-extend the piston rings during removal.

Note:

- **If the piston rings are to be re-used, note the orientation of the oil control rings prior to removal.**

Piston Wear Check

1. Measure the piston outside diameter, 8 mm up from the bottom of the piston and at 90° to the direction of the gudgeon pin.



1. Piston outside diameter
2. Measurement point
3. Circlip removal groove

All Cylinders	73.970 – 73.980 mm
Service limit	73.930 mm

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

Piston Rings/Ring Grooves

Check the pistons for uneven groove wear by visually inspecting the ring grooves.

If all the rings do not fit parallel to the groove upper and lower surfaces, the piston must be replaced.

Clean the piston ring grooves.

Fit the piston rings to the pistons. Check, using feeler gauges, for the correct clearance between the ring grooves and the rings. Replace the piston and rings if outside the specified limit.

Piston Ring to Ring Groove Clearance Check

Piston ring/Groove Clearance

Top ring Service limit	0.040 - 0.080 mm 0.095 mm
Second Service limit	0.020 - 0.060 mm 0.075 mm

Piston Ring Gap

Note:

- **The piston ring gap, with the piston ring fitted in the liner, must be checked before final assembly.**

1. Place the piston ring inside the liner.
2. Push the ring into the top of the cylinder, using the piston to hold the ring square with the inside of the bore. Continue to push the ring into the bore until the third groove of the piston is level with the cylinder top, around the full circumference of cylinder.

Aligning Piston Rings using the Piston

1. Remove the piston and measure the gap between the ends of the piston ring using feeler gauges.

Piston Ring End Gap Tolerances

Top Service limit	0.10 - 0.25 mm 0.37 mm
Second Service limit	0.25 - 0.40 mm 0.52 mm
Oil Control Service limit	0.10 - 0.35 mm 0.49 mm

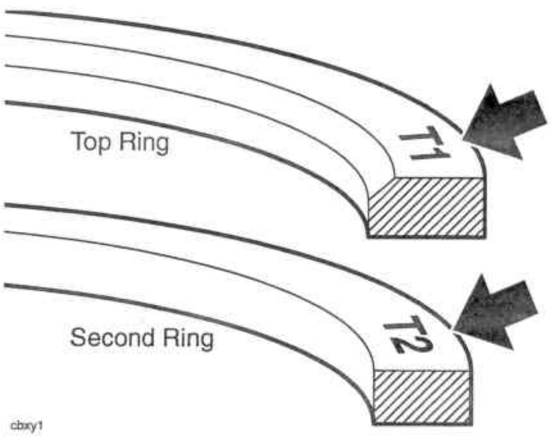
2. If the piston ring gap is found to be too small, the ring end must be carefully filed until the correct gap is achieved. If the gap is too large, replace the rings with a new set. If the gap remains too large with new piston rings fitted, both the piston and liner must be replaced.

Piston Assembly

1. Clean the piston ring grooves and fit the piston rings to the piston.

Note:

- **The top ring upper surface is marked 'T1' and can be identified by a chamfer on the inside edge. When new, the top ring also has a blue paint marking on its outer edge.**
- **The second ring upper surface is marked 'T2', is plain on the inside edge and has a bronze appearance. When new, the second ring also has a yellow paint marking on its outer edge.**
- **When new, the oil control rings can be fitted with either face upward. Used oil control rings must be refitted in the same orientation as noted prior to removal. When new, the oil control rings have white paint markings on their outside edge.**



Piston Ring Identification

1. Fit the piston onto the connecting rod.

Note:

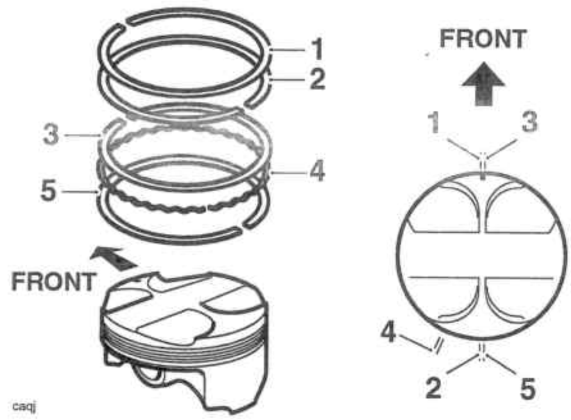
- **Connecting rods may be fitted either way around. However, ensure all three are fitted the same way.**

2. Lubricate the piston, small end and gudgeon pin with a 50/50 solution of engine oil and molybdenum disulphide grease.
3. Align the small end in the connecting rod with the gudgeon pin hole in the piston and fit the gudgeon pin.
4. Fit new circlips on both sides of the gudgeon pin ensuring the circlips are correctly fitted in the grooves.

Warning

Failure to use new gudgeon pin circlips could allow the pin to detach from the piston. This could seize the engine and lead to an accident.

5. The piston ring gaps must be arranged as shown in the diagram below.



1. Top ring
2. Second ring
3. First steel oil control ring
4. Oil control ring expander
5. Second steel oil control ring

Note:

- **The top ring gap should be positioned in the 12 o'clock position, and the second ring gap in the 6 o'clock position. The first steel oil control ring gap should be in the 12 o'clock position & and the second steel oil control ring should be in the 6 o'clock position. The oil control ring expander should be in the 7 o'clock position.**

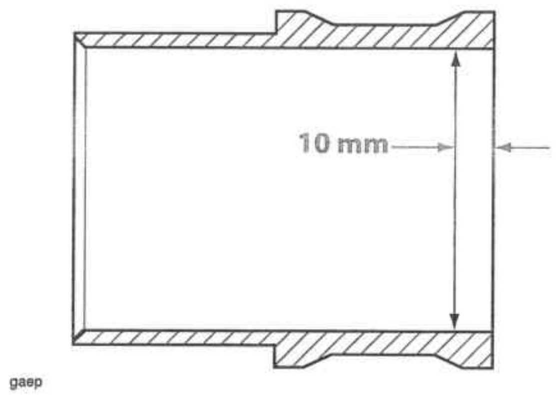
6. Fit the piston into the liner from below using a gentle rocking motion to engage the rings in the bore.

Cylinder Wear

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

Cylinder bore diameter

Standard:	73.985 – 74.003 mm
Service limit:	74.100 mm



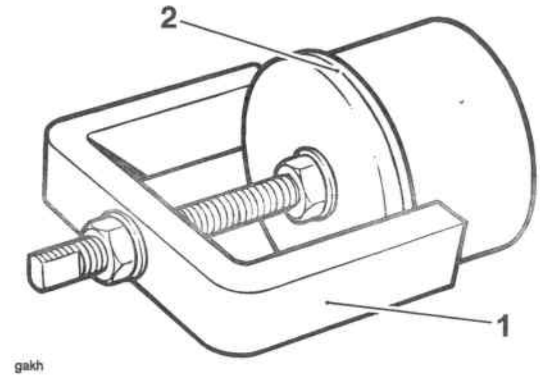
Test Position For Bore Wear Check (bore shown in section)

1. Measure the inside diameter 10 mm from the top of the bore as shown above.
2. If the reading is outside the specified limits, replace the liner and piston as an assembly.

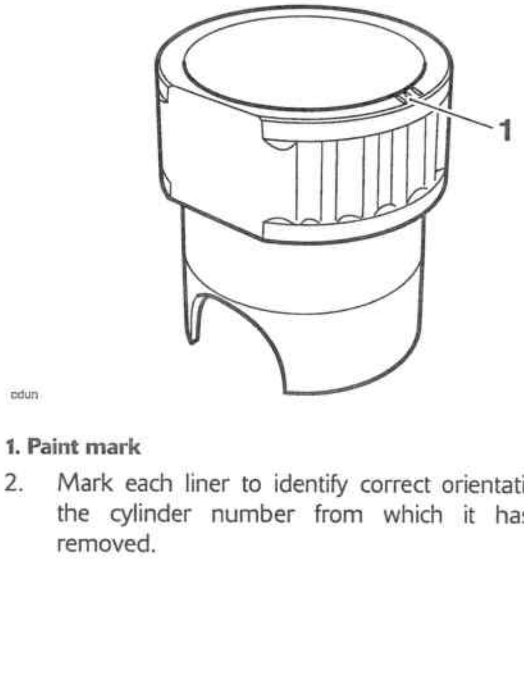
Cylinder Liners

Removal

1. Assemble the frame from tool T3880315 to Tool T3880315 as shown below.



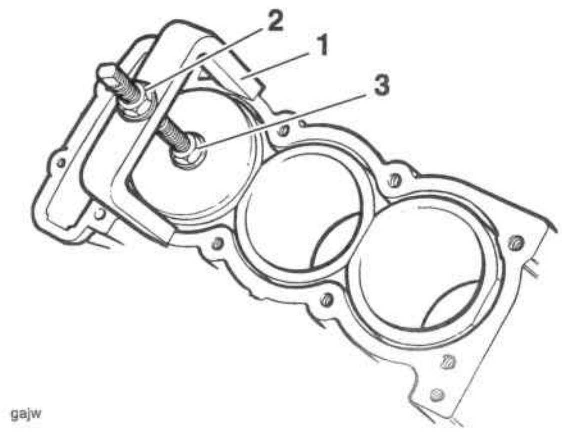
1. Frame from tool T3880315
2. Tool T3880101



1. Paint mark

2. Mark each liner to identify correct orientation and the cylinder number from which it has been removed.

3. Turn the crankshaft until the piston in the liner to be removed is at the bottom of its stroke.



1. Tool T3880315 and T3880101
2. Extraction nut
3. Locking nut

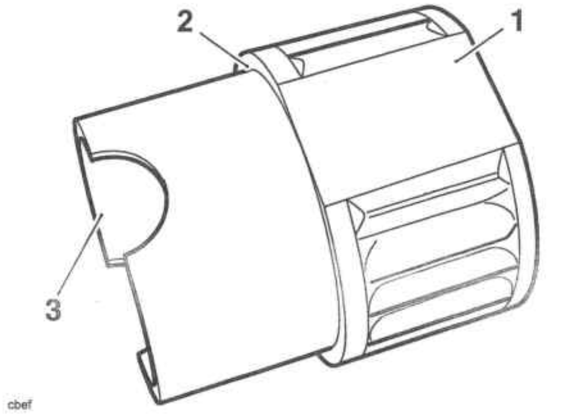
4. Check that the locking nut on tool T3880101 is loose, then fully unscrew the extraction nut.
5. Carefully fit the tool fully into the cylinder bore, positioning the tool legs on the crankcase. Turn the locking nut clockwise until the rubber sleeve on the tool tightly grips the bore of the liner.
6. Check that the tool legs are positioned to allow withdrawal of the liner, then turn the extraction nut clockwise to extract the liner. Take care to ensure that the piston/connecting rod is not allowed to fall against the inside of the crankcase.
7. Turn the locking nut anti-clockwise to release the liner.

Note:

- **The tool must be used to release the seal between the liner and the crankcase.**
- **It is not intended that the tool is used to fully extract the liner. Once the seal is released, the tool must be removed and the liner extracted by hand.**

Installation

1. Thoroughly clean the liner removing all traces of old silicone sealer.
2. Remove all traces of sealer from the crankcase bores.
3. Apply silicone sealer to the liner to crankcase mating face (at the factory, ThreeBond 1215 is used).
4. Fit each liner over the piston using a gentle rocking motion to allow compression of the piston rings.



1. Liner
2. Sealer area
3. Chamfer

Note:

- **The liners have a large chamfer at the bottom of the bore enabling fitting of the piston without need for a piston ring compressor.**

Caution

Fit each liner over whichever piston is at TDC. When turning the engine, do not allow the pistons to contact the inside of the crankcase and also do not allow fitted liners to lift off the crankcase base.

5. Continue fitting each liner in turn until all are fitted and sealed.

Note:

- **When the liners have been fitted, they should not be disturbed. If it is necessary to remove the liner after fitting, the sealer must be re-applied.**

Crankcase Breather

The upper crankcase is fitted with a labyrinth type breather system, which requires no maintenance. During engine disassembly and overhaul, check the oil drain tube for blockage and contamination.

6 Balancer

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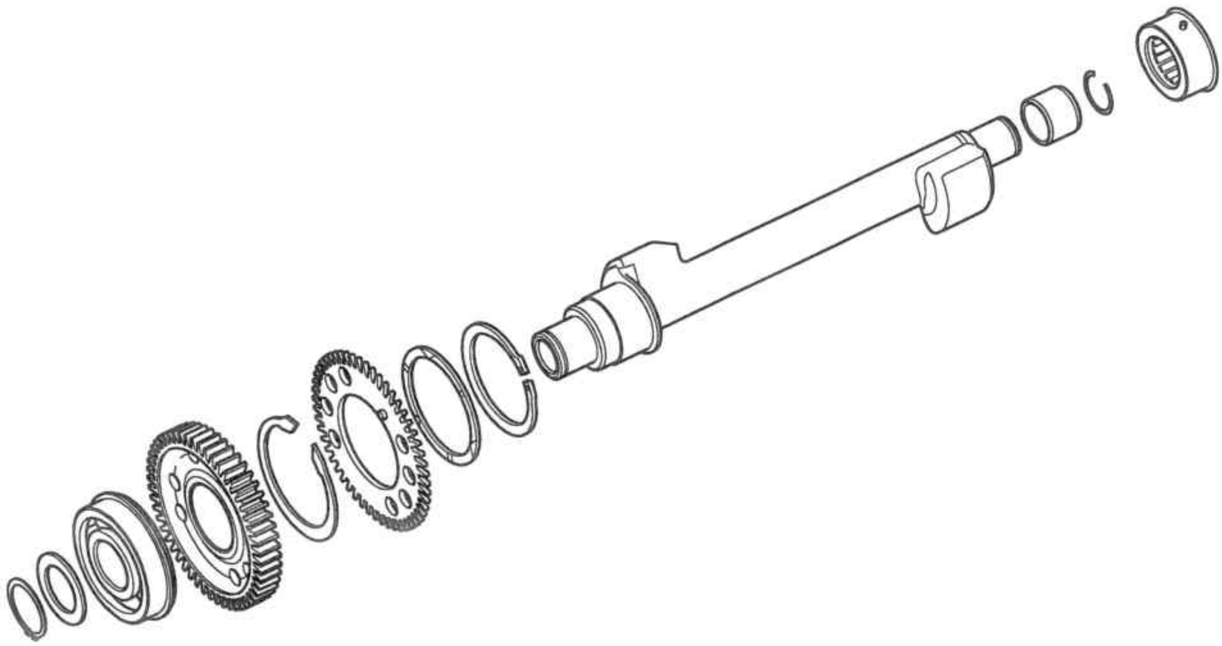
Balancer

Exploded View - Balancer Shaft



Balancer

The balancer is fitted to control 'pulsing' within the engine. Without any form of balancer, the engine would 'pulse' each time the crankshaft rotated. This 'pulsing' would be felt as a vibration which would amplify as the engine speed was increased.

The balancer has the effect of a pair of counterbalance weights which create an equal amount of energy in the opposite direction, and at the same time as that produced by the crankshaft, pistons and connecting rods. Because the opposing pulses occur at the same point of crankshaft rotation, and are of an equal magnitude, a state of equilibrium or balance is reached.

Removal

1. Separate the crankcase halves (see page *5-4*).
2. With the crankcase halves separated, lift out the balancer shaft complete with the shaft bearings/ circlips.

Note:

- **As the shaft is released from the crankcase, the backlash eliminator gear will spring out of alignment with the crankshaft.**

3. To remove the left hand bearing, slide the bearing, circlip and bearing sleeve from the balancer shaft. Note the orientation of the bearing prior to removal.
4. To remove the right hand bearing, remove the circlip and washer, and, using a press and press bars remove the bearing race from the shaft, ensuring the inner bearing race is supported. Note the orientation of the bearing prior to removal. DO NOT remove the drive gear from the shaft.

Warning

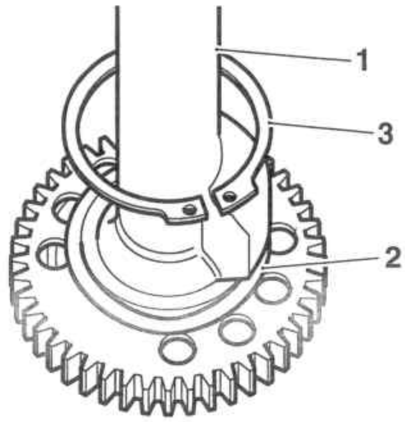
When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

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.

Caution

Do not remove the drive gear from the balancer shaft. The drive gear is aligned to the shaft. If the balancer and drive gear are not correctly aligned, severe engine vibration will occur leading to damage to components.

5. To strip the backlash eliminator from the drive gear, release the circlip and remove the wave-washer, backlash gear and spring.



1. Balancer shaft
2. Wave washer
3. Circlip

Inspection

1. Inspect all gears for chipped or missing teeth.
2. Inspect all bearings for signs of overheating (blue discolouration), seized or damaged rollers, and any other damage.
3. Inspect the backlash spring for deformities, damage etc.
4. Inspect the gear teeth for overheating (blue discolouration).

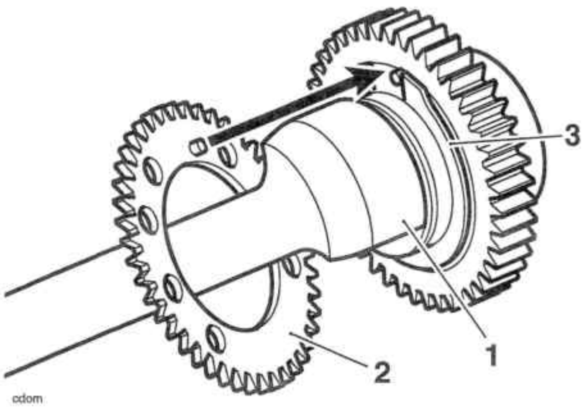
Balancer

Assembly/Installation

Note:

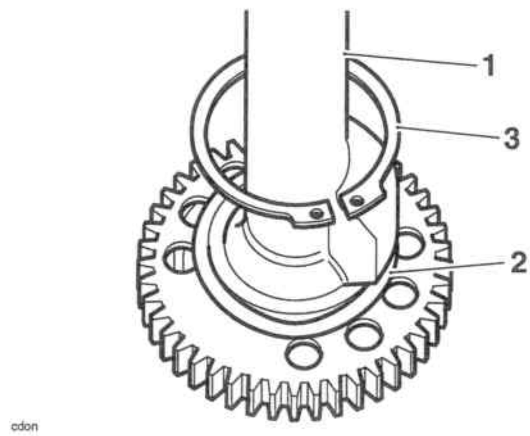
- **Before assembling the backlash gear to the balancer shaft, lubricate all contact surfaces of the balancer drive gear, backlash spring and backlash gear with a 50/50 solution of engine oil and molybdenum disulphide grease.**

1. If the backlash gear was disassembled, fit the backlash spring over the shaft and position to the balancer drive gear, positioning the spring ends on either side of the peg.
2. Fit the backlash gear, ensuring its peg is located anti-clockwise (viewed from the left hand bearing end of the shaft) of the balancer gear peg and also between the spring ends.



1. Balancer shaft
2. Backlash gear
3. Backlash spring

3. Fit the wave washer and secure all components in position with the circlip.



1. Balancer shaft
2. Wave washer
3. Circlip

4. Using a press and press bars, fit the right hand bearing to the shaft, with the circlip positioned nearest to the drive gear. Ensure the inner race of the bearing is supported when installing the bearing.

Warning

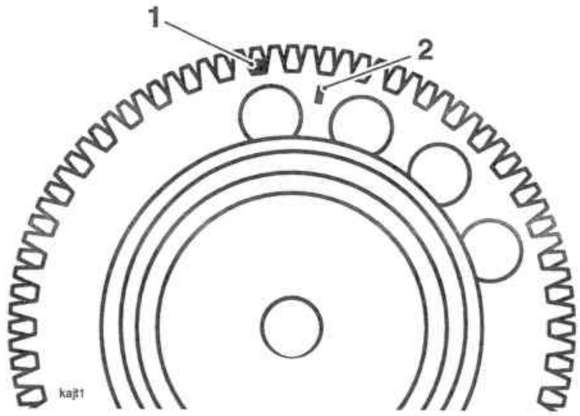
When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently break-up under load and the debris caused during break-up may cause damage and injury to unprotected parts of the body.

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.

5. Refit the washer and a new circlip to the shaft.
6. Lubricate and fit the left hand bearing and install a new circlip in the same orientation as noted prior to removal.

Note:

- **Prior to installation in the crankcase, it is essential that the markings on the backlash eliminator and drive gears are brought into alignment against the tension of the spring. This will facilitate correct positioning of the balancer in relation to the crankshaft when both are installed in the crankcase.**



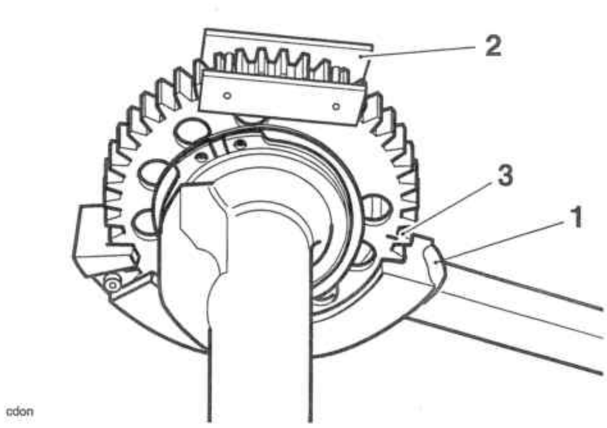
1. Drive gear dot
2. Backlash gear line

7. Using tool T3880106, bring the backlash and drive gear marks into alignment against the backlash spring as follows:
   - **Engage the peg of tool T3880106 into a tooth of the backlash gear. Rotate the backlash gear against the spring until the marks align.**

Note:

- **When in alignment, the line on the backlash gear must be located directly above the drive gear tooth marked with a dot.**
- **Since the drive gear dot cannot be seen when the backlash gear is in alignment, always mark the dot-marked gear tooth with a paint mark in order that it can always be identified.**

8. Secure the backlash gear in position with the fixture supplied with the tool by placing the fixture pegs across two gear teeth (ensure that the fixture will not be in the way when assembling the balancer to the crank).

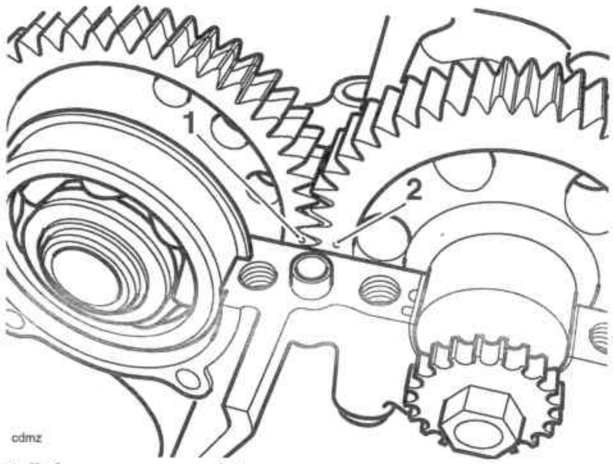


1. Tool T3880106
2. Securing fixture
3. Balancer backlash gear marking

Caution

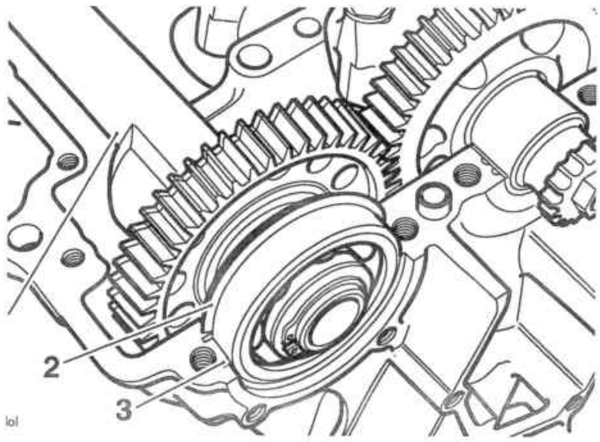
If the balancer and crankshaft are not correctly aligned, severe engine vibration will occur leading to damage to components.

9. With the drive and backlash eliminator gears still correctly aligned, locate the balancer to the crankcase. Align the balancer gears and crankshaft as shown in the illustration below.



1. Balancer gear marking
2. Crankshaft markings

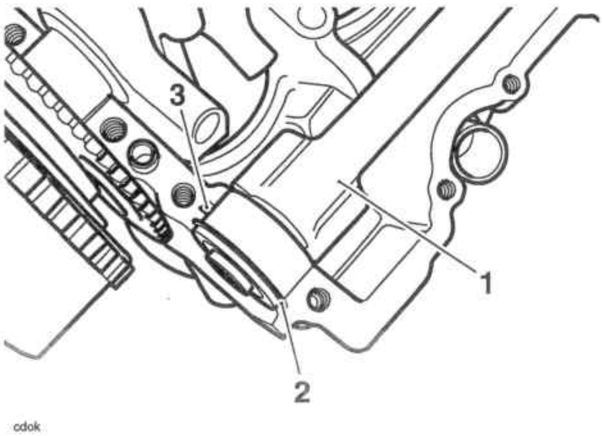
10. Ensure that the right hand bearing circlip and dowel locate correctly in the corresponding groove in the crankcase.



1. Balancer shaft (right hand bearing)
2. Circlip
3. Dowel

Balancer

11. Ensure that the left hand bearing circlip and dowel locate correctly in the corresponding groove in the crankcase



1. Balancer shaft (left hand bearing)
2. Circlip
3. Dowel

12. Remove the securing fixture.
13. Check that the balancer and crankshaft are correctly aligned before continuing to assemble the crankcase halves.
14. Assemble the crankcase halves (see page *5-4*).

7 Transmission

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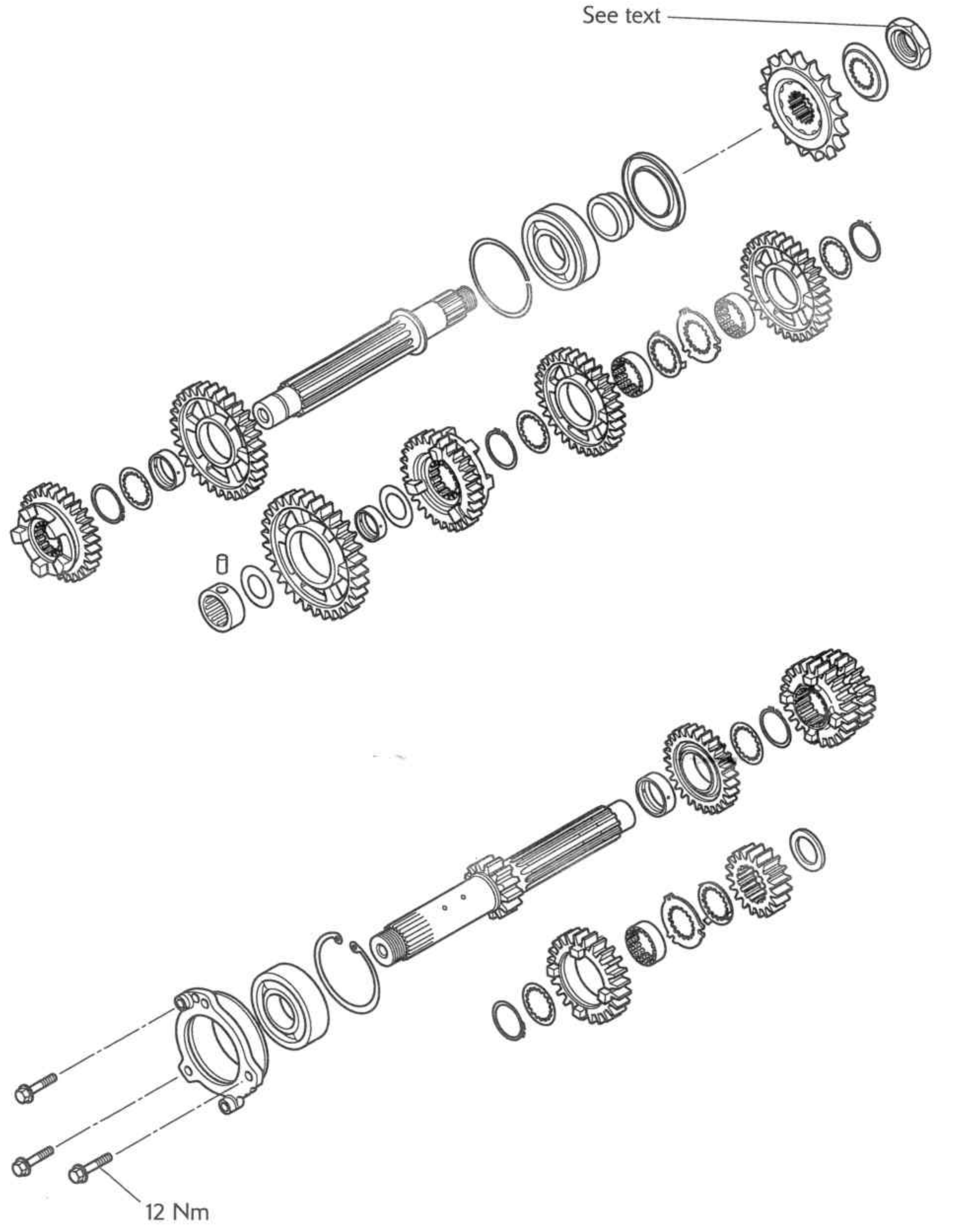
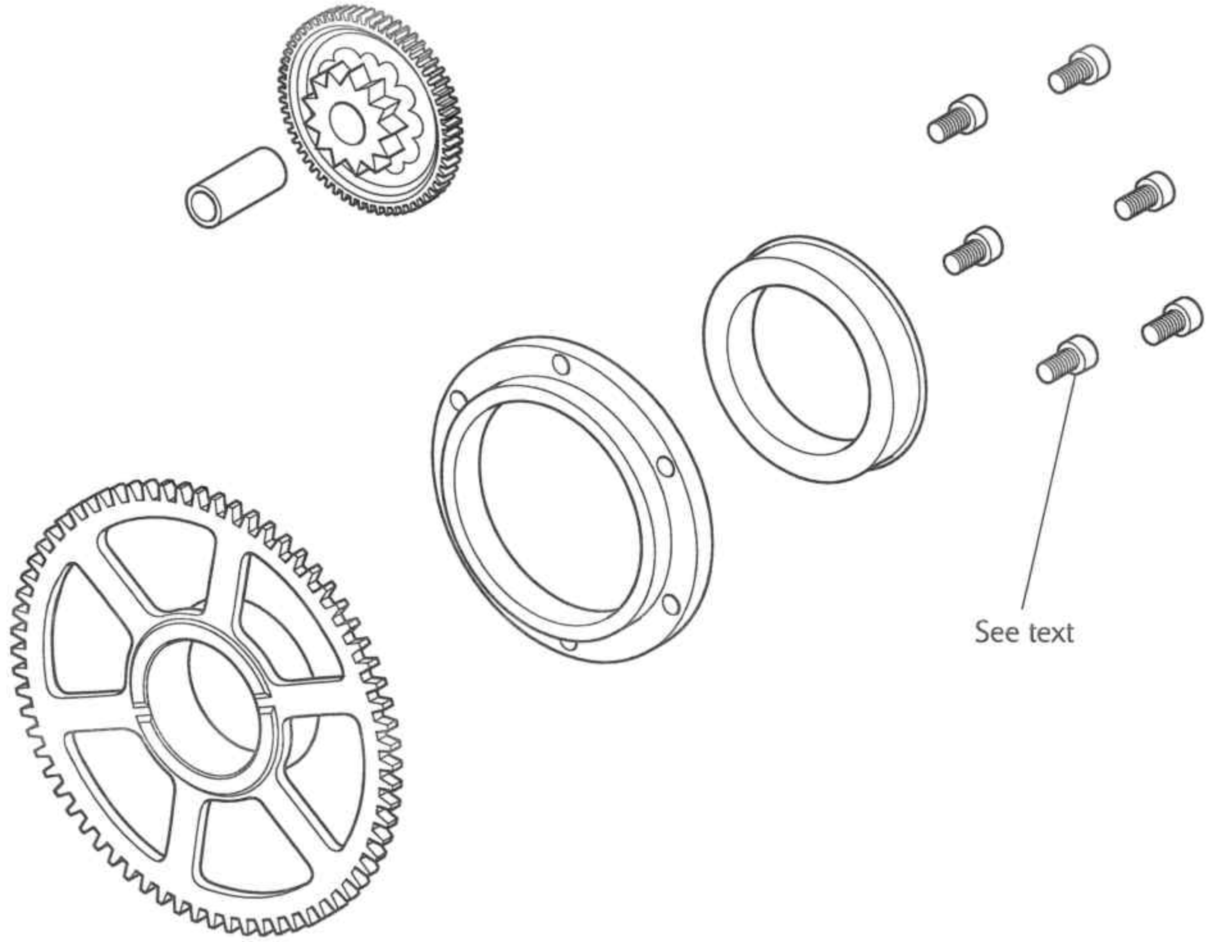
Transmission

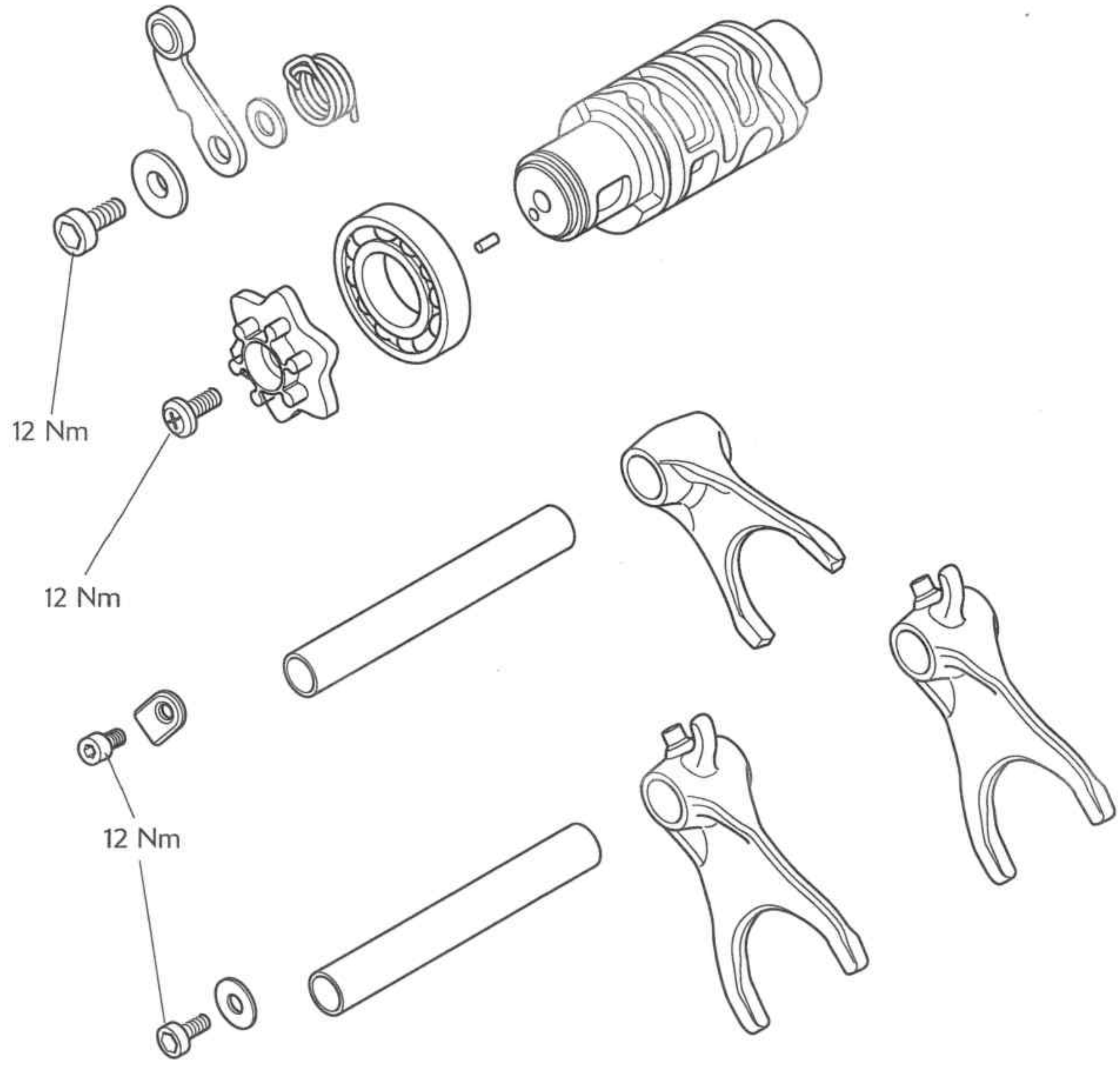
Exploded View, Input and Output Shafts



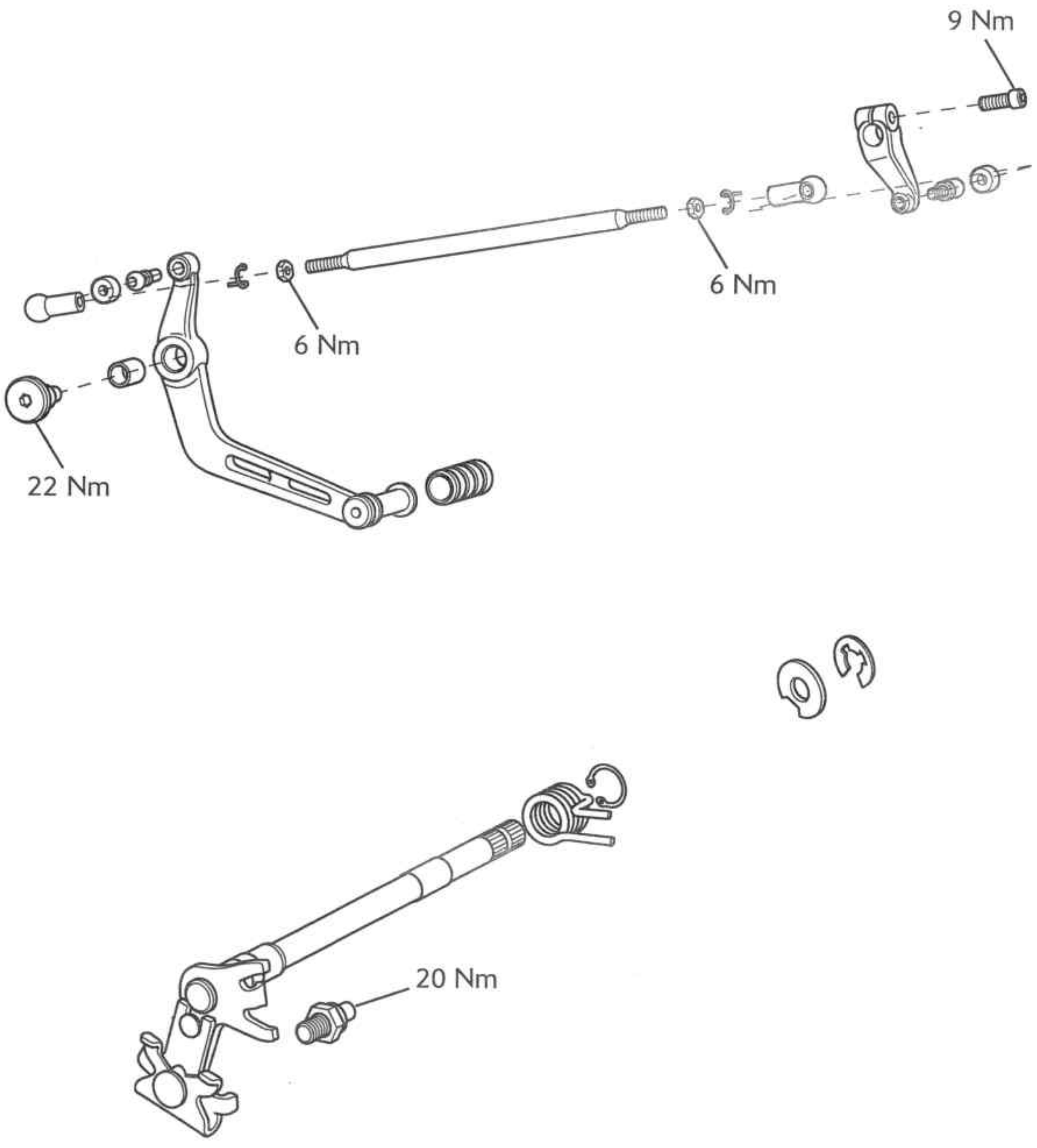
Exploded View, Sprag Clutch and Starter Gears



Exploded View, Gear Selectors and Drum



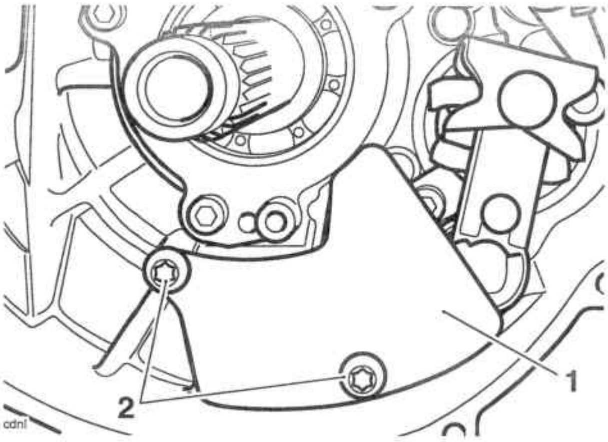
Exploded View, Gear Change Mechanism



Selector Shaft, Selector Forks and Drum

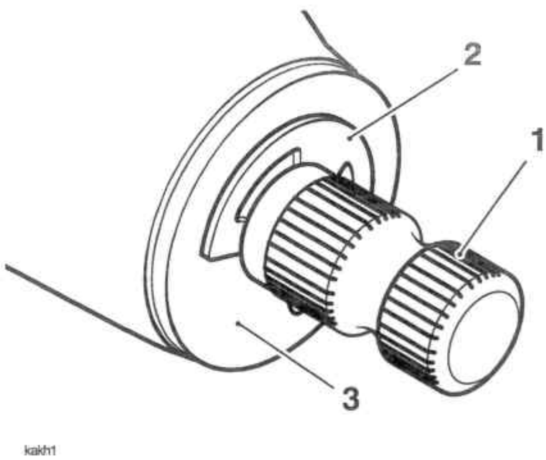
Removal

1. Remove the engine from the frame (see page *9-2*).
2. Separate the two halves of the crankcase (see page *5-4*).
3. Remove the output shaft from the crankcase (see page *7-11*).
4. Release the two fixings and remove the baffle plate from the crankcase breather. Discard the fixings.



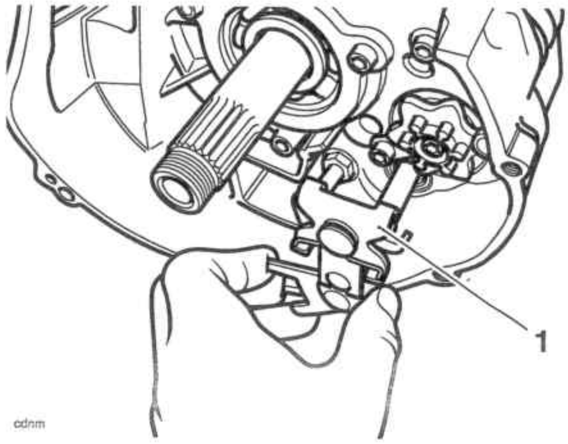
1. Crankcase breather baffle plate
2. Fixings

5. If not already removed, note the position and orientation of the gear pedal crank in relation to the shaft, then remove the crank.
6. Remove the E-clip and washer from the gear pedal end of the gear change shaft.



1. Gear change shaft
2. E-clip
3. Washer

7. Withdraw the gear change shaft from the clutch end of the crankcase.

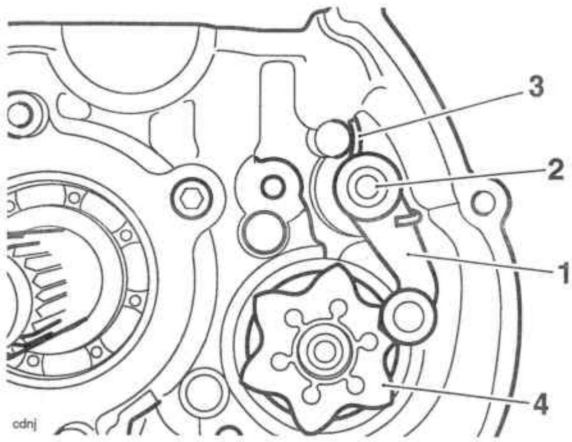


1. Gear change shaft

Note:

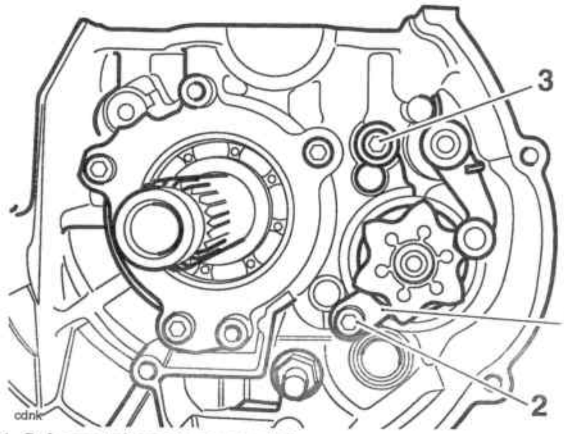
- **The detent arm is held in position under spring pressure. Prior to removal, note the orientation of the detent arm, fixing and spring, relative to the selector drum detent wheel. The same orientation must be retained on assembly.**

8. Release and remove the fixing securing the detent arm.
9. Withdraw the detent arm complete with its flanged sleeve, spring and washer.



1. Detent arm
2. Fixing
3. Spring
4. Detent wheel

10. Remove and discard the two selector shaft retaining fixings, noting the position of the washer and the selector drum keeper plate.



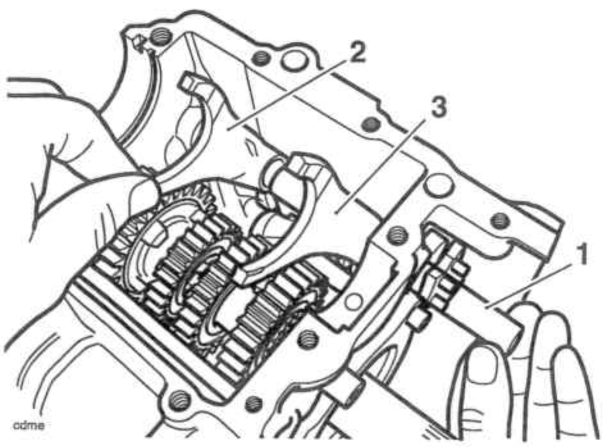
1. Selector drum keeper plate
2. Input selector shaft fixing
3. Output selector shaft fixing and washer

> **⚠ Caution**
>
> The two output shaft selector forks can be fitted incorrectly. Ensure the position and orientation of the selector forks are marked prior to removal. Incorrect fitting of the selector forks will cause gearbox damage.

Note:

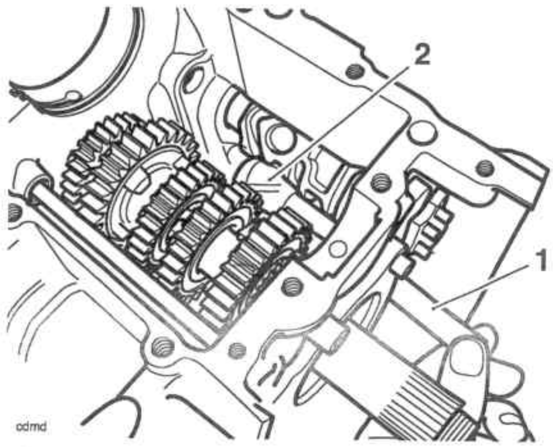
- **The fifth gear selector fork, located nearest to the clutch, has a special molybdenum coating on the selector forks. This special coating can identified by its dull grey colour, when compared to the sixth gear selector fork which is chromed.**

11. Slide the output selector shaft from the crankcase in the direction of the clutch. Collect the two selector forks as they are released by the selector shaft.



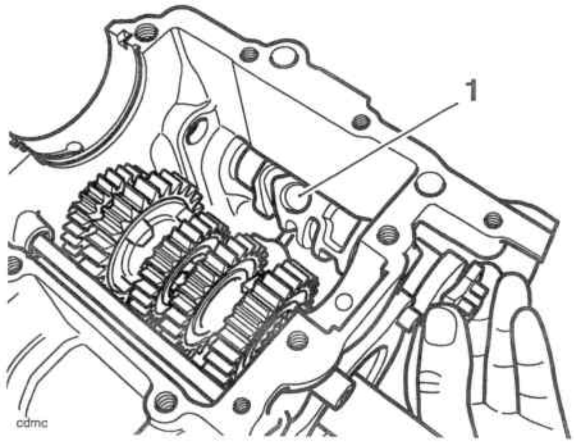
1. Output selector shaft
2. Sixth gear selector fork
3. Fifth gear selector fork

12. Noting the position of the selector fork, remove the input selector shaft, leaving the selector fork in the gearbox.



1. Input selector shaft
2. Selector fork

13. Withdraw the selector drum from within the crankcase.



1. Selector drum removal

14. Collect the input shaft selector fork from the crankcase.

Inspection

1. Examine all components for damage and/or wear, paying particular attention to the selector forks and selector drum. Replace any parts that are damaged and/or worn.

Gear selector fork thickness

Standard	5.90- 6.00 mm
Service limit	5.80 mm

Gear selector groove width

Standard	6.10- 6.17 mm
Service limit	6.27 mm

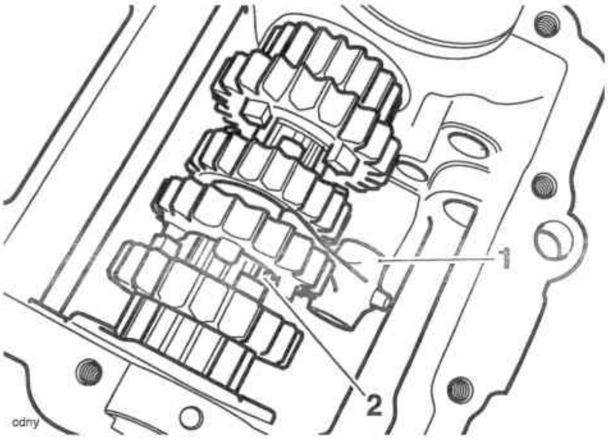
Selector fork to groove clearance

Service limit	0.47 mm max

2. Examine the gear change shaft seal for damage and/or wear. Replace the seal if damaged and/or worn.

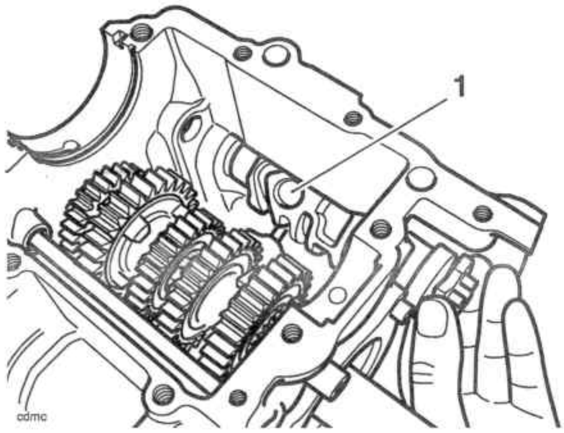
Installation

1. Position the input shaft selector fork into the crankcase, locating the forks into the selector groove on the input shaft. Ensure the fork is fitted in the position noted during removal.



1. Input shaft selector fork
2. Input shaft

2. Using clean engine oil, lubricate the selector drum bearings. Lubricate the selector drum tracks with a 50/50 solution of engine oil and molybdenum disulphide grease
3. Position the selector drum into the crankcase.



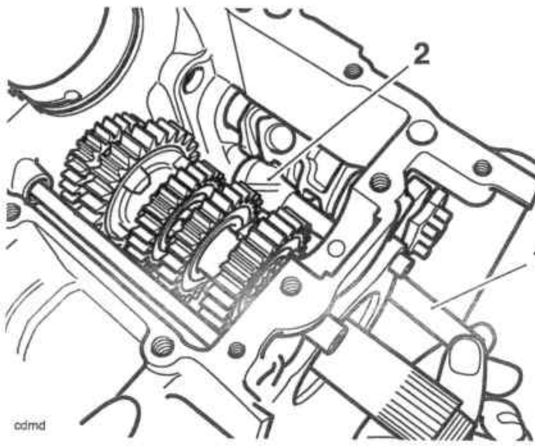
1. Selector drum

4. Rotate the selector drum and ensure a smooth movement. Rectify as necessary.

Caution

The selector forks can be fitted incorrectly. Ensure the position and orientation of the selector forks are the same as noted during removal. Incorrect fitting of the selector forks will cause gearbox damage.

5. Push the input selector shaft into the crankcase from the clutch end. As the shaft is inserted locate the selector fork onto the shaft. Ensure the fork is fitted in the position noted during removal.

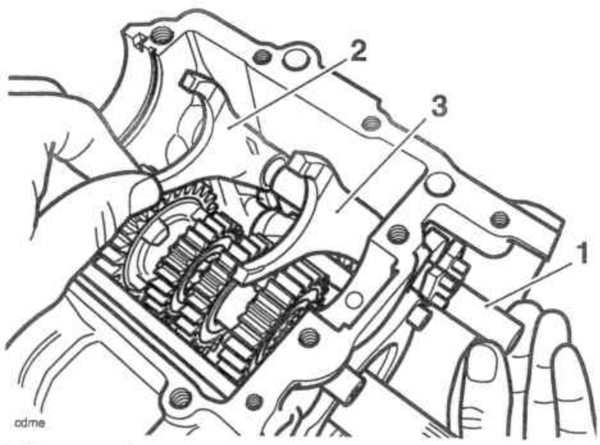


1. Input selector shaft
2. Selector fork

Note:

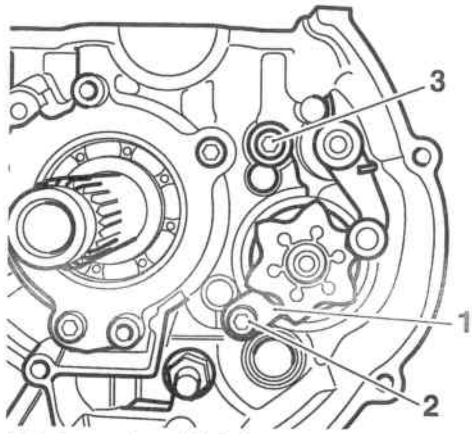
- **The fifth gear selector fork, located nearest to the clutch, has a special molybdenum coating on the selector forks. This special coating is identified by its dull grey colour.**

6. Push the output selector shaft into the crankcase from the clutch end. As the shaft is inserted, locate the selector forks. Ensure the selector forks are fitted in the positions noted during removal.



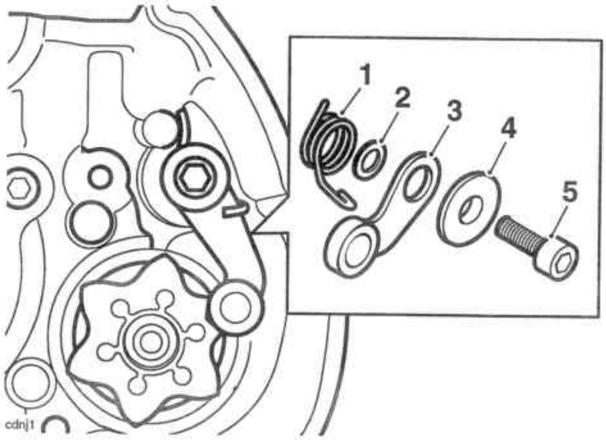
1. Output selector shaft
2. Sixth gear selector fork
3. Fifth gear selector fork

7. Refit two new selector shaft retaining fixings, ensuring the washer and the selector drum keeper plate are fitted in the positions noted during removal. Tighten the fixings to **12 Nm**.



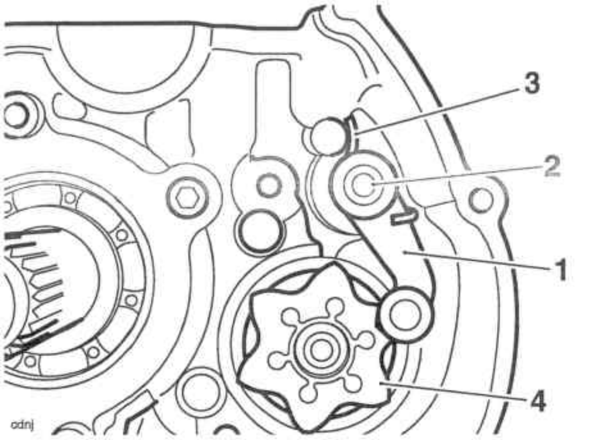
1. Selector drum/shaft keeper plate
2. Fixing
3. Output selector shaft fixing and washer

8. Assemble the detent arm as noted on removal and place up to the crankcase.



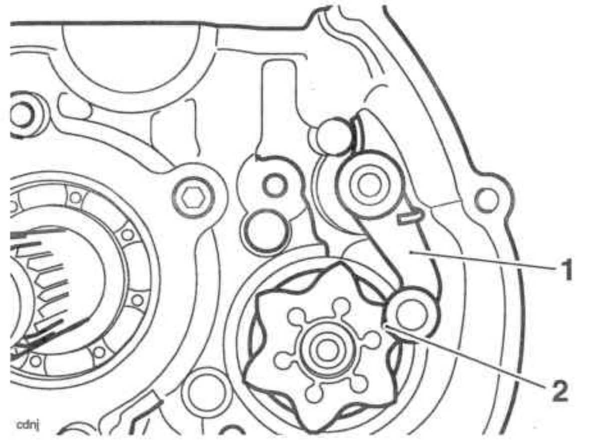
1. Spring
2. washer
3. Detent arm
4. Flanged sleeve
5. Fixing

9. Hold the detent arm assembly in position and insert a new fixing. Start the thread and push the detent arm, using finger pressure only, to locate on the selector drum detent wheel.
   Ensure the detent arm remains correctly located on the detent wheel and the spring is correctly seated in the recess in the crankcase. Ensure the shoulder of the top hat washer is located in the bore detent arm and tighten the fixing to **12 Nm.**



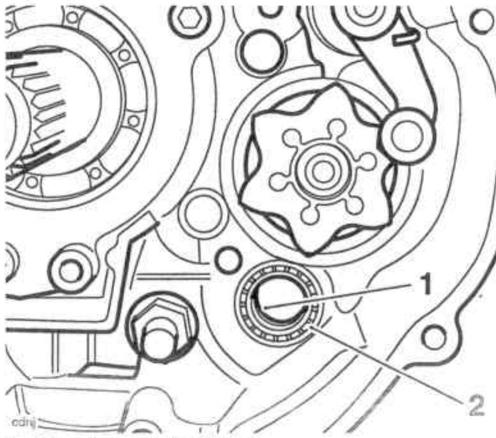
1. Detent arm
2. Fixing
3. Spring
4. Selector drum detent wheel

10. Rotate the selector drum to the neutral position. Ensure that the detent arm locates in the raised profile in the detent wheel (neutral position).



1. Detent arm
2. Neutral position

11. Using clean engine oil, lubricate the lip of the seal on the gear change shaft.



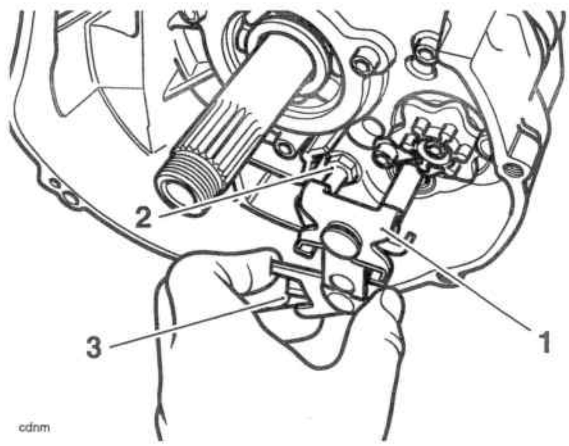
1. Gear change shaft seal
2. Gear change shaft bearing

12. Lubricate, with a 50/50 solution of engine oil and molybdenum disulphide grease, both sides of the forks and the slider plates of the selector mechanism on the gear change shaft.

Caution

Take care to avoid damaging the lip of the seal when inserting the gear change shaft into the crankcase. A damaged seal will lead to oil loss and could result in engine damage.

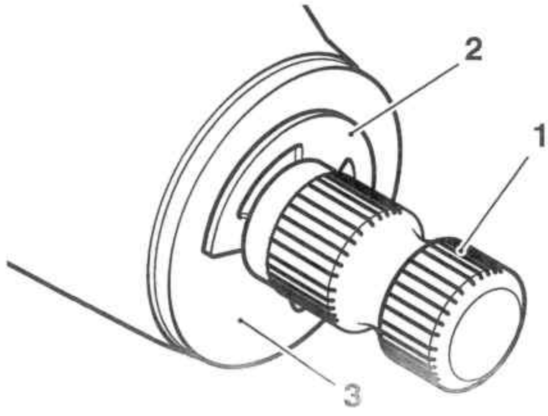
13. Insert the gear change shaft into the crankcase. Gently push the gear pedal end of the shaft through the bearing and lip seal at the clutch side of the crankcase, and the sealed bearing, located at the gear pedal side of the crankcase.



1. Gearchange shaft
2. Abutment bolt
3. Spring

14. Ensure that the gear change shaft fingers locate in the detent wheel/arm and that the spring fits either side of the abutment bolt.

15. Fit the washer and E-clip to the gear pedal end of the gear change shaft.



1. Gear change shaft
2. E-clip
3. Washer

16. Fit the gear pedal crank to the shaft in the same orientation as noted prior to removal. Ensure the dot mark on the shaft aligns with the split line on the gear pedal crank. Tighten the fixing to **9 Nm**.
17. Incorporating new fixings, refit the baffle plate to the crankcase breather. Tighten the fixings to **9 Nm**.
18. Refit the output shaft (see page *7-12*).
19. Assemble the two halves of the crankcase (see page *5-4*)
20. Refit the engine to the frame (see page *9-3*).

Input and Output Shafts Assemblies

Removal

Note:

- **The input and output shafts may be removed from the upper crankcase after first separating the lower crankcase from the upper.**

Note:

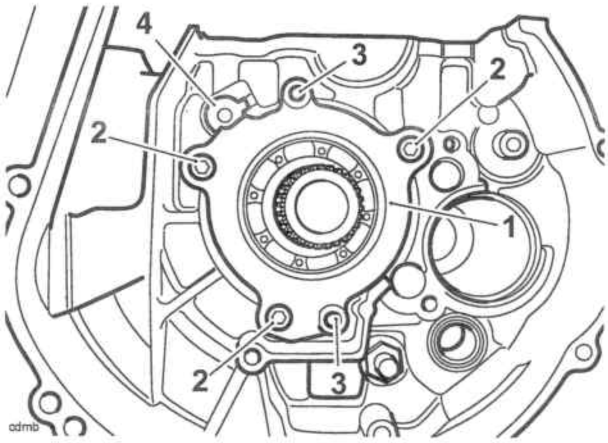
- **The rear needle roller bearing on the input shaft remains in the crankcase on removal of the shaft.**

1. Remove the engine from the frame (see page *9-2*).
2. Separate the two halves of the crankcase (see page *5-4*).
3. Lift the output shaft from the upper crankcase, noting the orientation of each bearing, their circlips and dowels.
4. Remove the selector shafts and forks (see page *7-6*).

Note:

- **The input shaft bearing housing fixings may not be re-used but should be retained for use during installation of the input shaft.**

5. Release the three fixings securing the input shaft bearing housing to the upper crankcase.
6. Insert two M6 bolts into the two threaded holes at the periphery of the bearing housing. Evenly and progressively tighten both bolts to draw the bearing housing and input shaft from the crankcase.

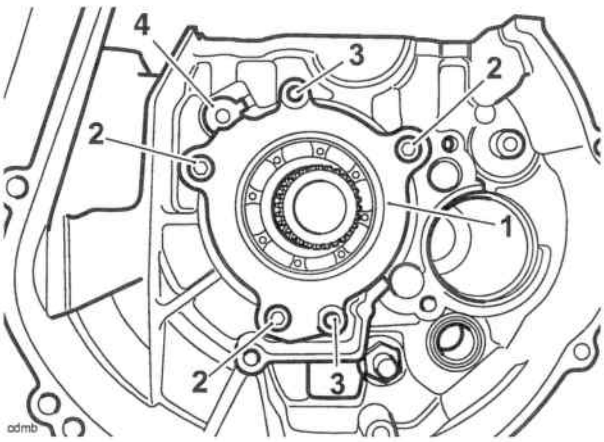


1. Bearing housing
2. Fixings
3. M6 threaded holes
4. Transmission oil tube

7. If required, the transmission oil tube can now be removed. Remove and discard the three oil tube O-rings.

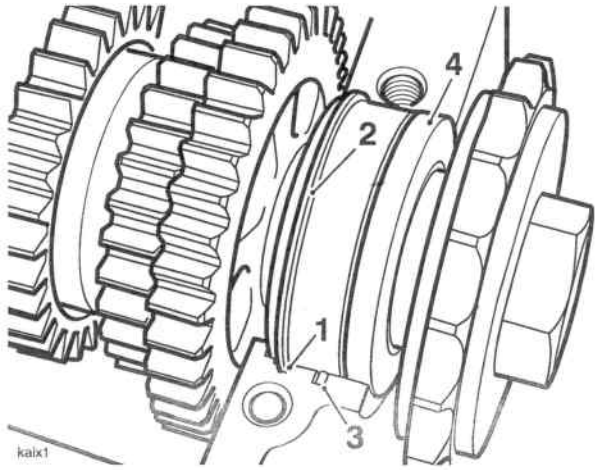
Installation

1. If removed, check the transmission oil tube for blockages and contamination. Carefully fit new O-rings to the transmission oil tube and insert the tube into the crankcase, ensuring the tag on the tube locates in the slot in the crankcase.
2. Locate the input shaft to the upper crankcase, installing it through the aperture for the bearing housing.
3. Fit the bearing housing into the aperture, by hand, as deeply as possible.
4. Using the old fixings, evenly and progressively tighten them to draw the bearing housing into the upper crankcase until fully home. Remove and discard the fixings. Install new fixings to the bearing housing and tighten to **12 Nm**.



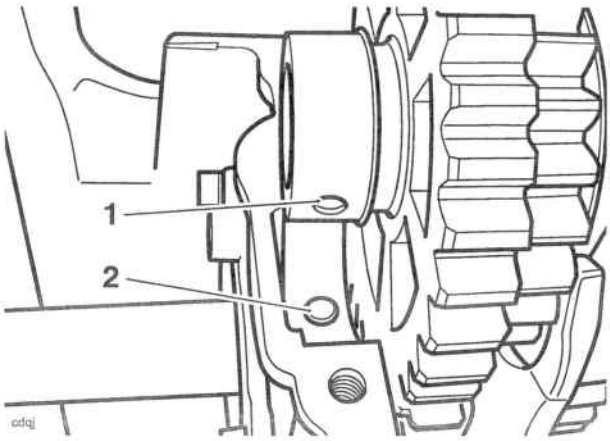
1. Bearing housing
2. Fixings
3. M6 threaded holes
4. Transmission oil tube

5. Refit the selectors and shafts (see page *7-6*).
6. Refit the output shaft to the crankcase ensuring the snap-ring on the outside of the inner bearing locates in the corresponding groove in the crankcase, and the dowel locates in the slot in the upper crankcase.
7. Ensure the output shaft seal aligns with its recess in the crankcase.



1. Groove in crankcase
2. Retaining ring
3. Dowel
4. Seal

8. Ensure the hole in the output shaft needle roller bearing outer race is positioned to locate in the dowel provided in the upper crankcase.



1. Roller bearing
2. Dowel

9. Assemble the two halves of the crankcase (see page *5-4*)
10. Refit the engine to the frame (see page *9-3*).

Input Shaft

Disassembly

Note:

- **The numbers in brackets in the following text refer to the exploded view on page *7-14*.**

Working from the opposite end to where the clutch assembly is fitted, dismantle the input shaft as follows:

1. Slide off the plain thrust washer (1).
2. Mark one side of second gear to denote its correct orientation. Remove second gear (2).
3. Remove the splined lock washers (3 and 4).
4. Mark one side of sixth gear to denote its correct orientation. Remove sixth gear (6), complete with the splined bush (5) which runs inside the gear.
5. Remove the splined thrust washer (7) from in front of the circlip between sixth and third/fourth gear.
6. Remove the circlip (8) from the shaft.
7. Mark one side of the combined third/fourth gear to denote its correct orientation. Remove the combined third/fourth gear (9).
8. Remove the circlip (10) from in front of fifth gear.
9. Remove the splined thrust washer (11) adjacent to fifth gear.
10. Mark one side of fifth gear to denote its correct orientation. Remove fifth gear (12), complete with the plain bush (13) which runs inside the gear.

Note:

- **Unless the bearing at the clutch end of the input shaft is damaged or worn, it is not normally necessary to remove it from the shaft. The bearing is pressed onto the shaft and is also pressed into its housing and retained by a circlip. The bearing and housing are removed from the shaft together and are then separated.**

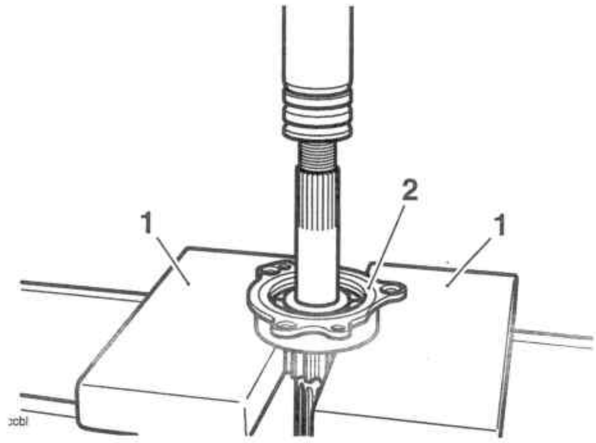
11. Remove the circlip (15) from the bearing housing.

⚠ Warning

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

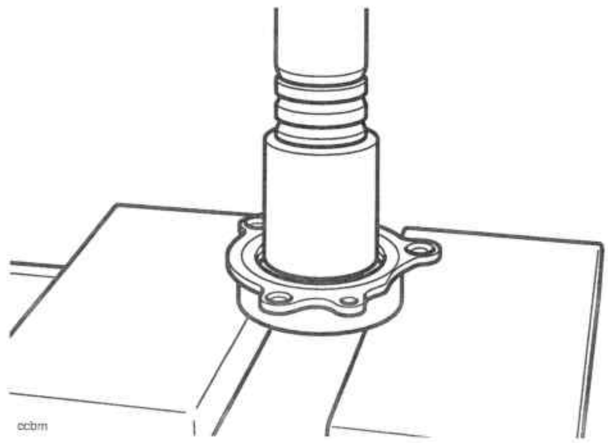
Never wear loose clothing, which could become trapped in the press and cause crushing injuries to the hand, arms or other parts of the anatomy.

12. Support the bearing and housing (16 and 17) on press bars, then press the shaft (14) through the bearing and housing as shown below.



1. Press bars
2. Bearing/housing

13. Support the outer circumference of the bearing housing on press bars, then press the bearing through the housing.

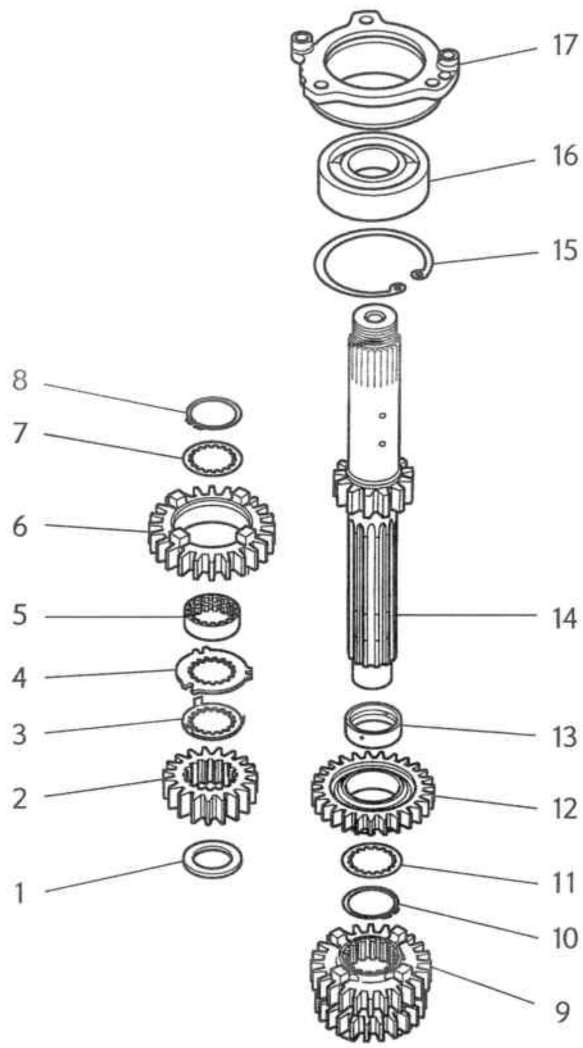


Pressing out the Bearing

Inspection

1. Examine all gears, bearings and bushes and thrust washers for damage, distortion, chipped teeth and wear beyond the service limits. Replace all defective components and always use new circlips to assemble the shaft.
2. Thoroughly clean the bearing housing and inspect for damage, scoring and cracks. Replace the housing if necessary.

Exploded View - Input Shaft



1. Thrust washer
2. Second gear
3. Lock washer
4. Splined washer
5. Splined bush
6. Sixth gear
7. Splined thrust washer
8. Circlip
9. Third/fourth gear
10. Circlip
11. Splined thrust washer
12. Fifth gear
13. Plain bush
14. Input shaft
15. Circlip
16. Bearing
17. Bearing housing

Assembly

Note:

- **The numbers in brackets in the following text refer to the exploded view on page *7-14*.**
- **Lubricate each gear, thrust washer and bush with clean engine oil during assembly.**

Warning

When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently 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 injuries to the hand, arms or other parts of the anatomy.

Caution

Bushes and gears with oil holes must always be MISALIGNED with the corresponding oil holes in the input shaft. Reduced oil pressure and gear lubrication may result from alignment of the oil holes, which would cause premature wear of engine and transmission components.

Caution

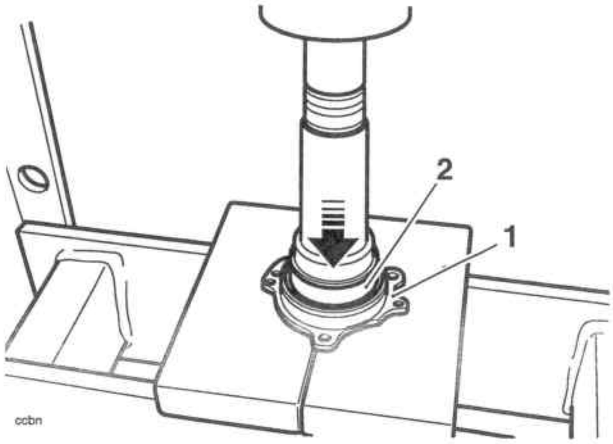
Removing the input shaft bearing from the shaft and its housing will damage the bearing and snap ring. Never re-use removed bearings or snap rings as use of damaged or weakened components could lead to engine and transmission damage. Also, check for damage to the housing itself.

1. Apply aproximately 1 gram of ThreeBond 1375B to the circumference of a new bearing and position the bearing to the housing, ensuring the bearing dowel aligns with the slot in the housing. Ensure no ThreeBond enter the bearing.

Caution

Press only on the bearing outer race to prevent bearing damage.

2. Support the housing on press bars as shown below and press the bearing fully into the housing in the direction of the arrow.



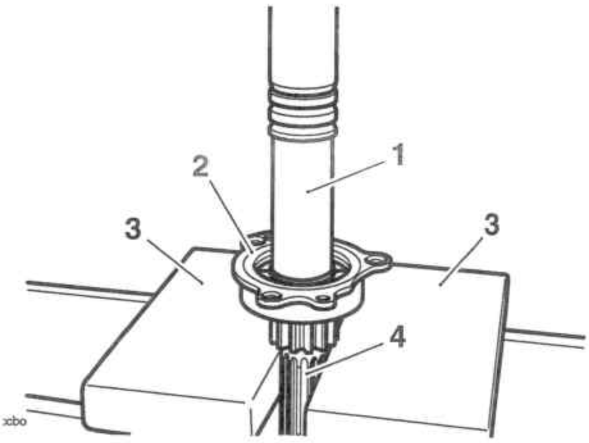
1. Bearing housing
2. Bearing

3. Retain the bearing with a new circlip.

Caution

Press only on the bearing inner race to prevent bearing damage.

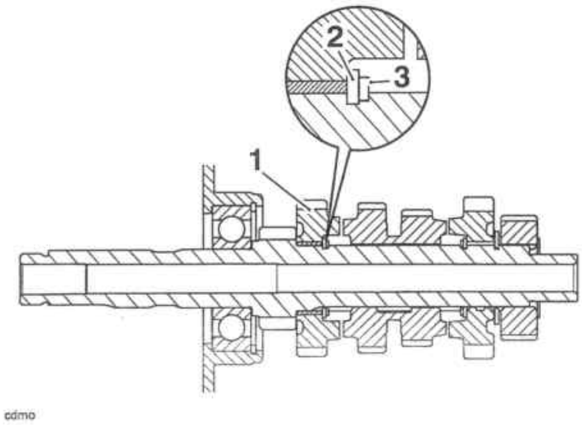
4. Locate the bearing and housing to the input shaft. Carefully support the shaft on the press bed, and using a suitable sleeve over the input shaft to ensure the bearing is pressed only on the inner race, press the bearing onto the shaft.



1. Sleeve
2. Bearing/housing
3. Press bars
4. Input shaft

5. Fit the plain bush (13) to the shaft.
6. Fit fifth gear (12) to the input shaft as noted during disassembly, with the dog teeth pointing away from the input shaft bearing.
7. Slide on the splined thrust washer (11).

8. Fit a new circlip (10) to the input shaft ensuring that the clip is located in the circlip groove as shown below.



1. Fifth gear
2. Thrust washer
3. Circlip

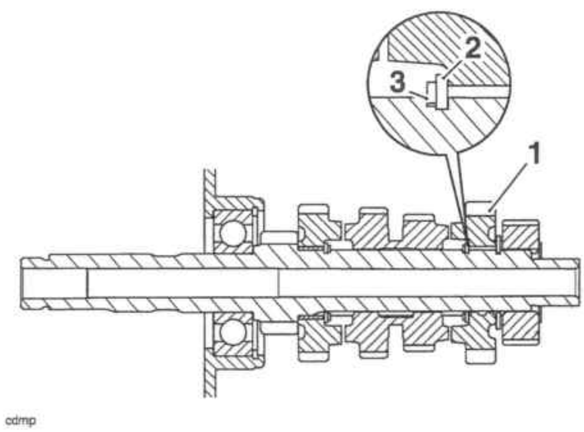
9. Fit the combined third/fourth gear (9) as noted during disassembly, with the larger gear facing toward fifth gear. Ensure that the oil hole in the input shaft DOES NOT align with the oil hole in the gear.

Warning

If the oil hole in the third/fourth gear is aligned with the corresponding hole in the input shaft, engine oil pressure and gear lubrication will be reduced.

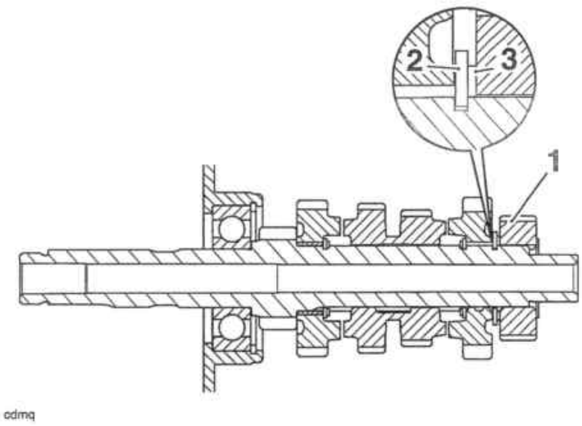
Reduced oil pressure and gear lubrication will cause engine damage and could also lead to engine seizure resulting in loss of motorcycle control and an accident

10. Fit a new circlip (8) to the input shaft ensuring that the circlip is located in the circlip groove as shown below.



1. Sixth gear
2. Thrust washer
3. Circlip

11. Fit the splined thrust washer (7) to the input shaft and slide up the shaft until in contact with the circlip.
12. Fit the splined bush (5) from sixth gear. Ensure that the oil hole in the input shaft DOES NOT align with the oil hole in the gear.
13. Fit sixth gear (6) as noted during disassembly, with the dog teeth facing third/fourth gear.
14. Fit the splined and lock washers (4 and 3), ensuring the tabs in the smaller washer (3) locate in the slots in the larger (4) washer.



1. Second gear
2. Large splined lock washer
3. Small splined lock washer

15. Fit second gear (2) to the shaft as noted during disassembly.
16. Fit the plain thrust washer (1) adjacent to second gear.

Output Shaft

Note:

- ***The numbers in brackets in the following text refer to the exploded view on page 7-18.***

Working from the opposite end to the drive sprocket, dismantle the output shaft as follows.

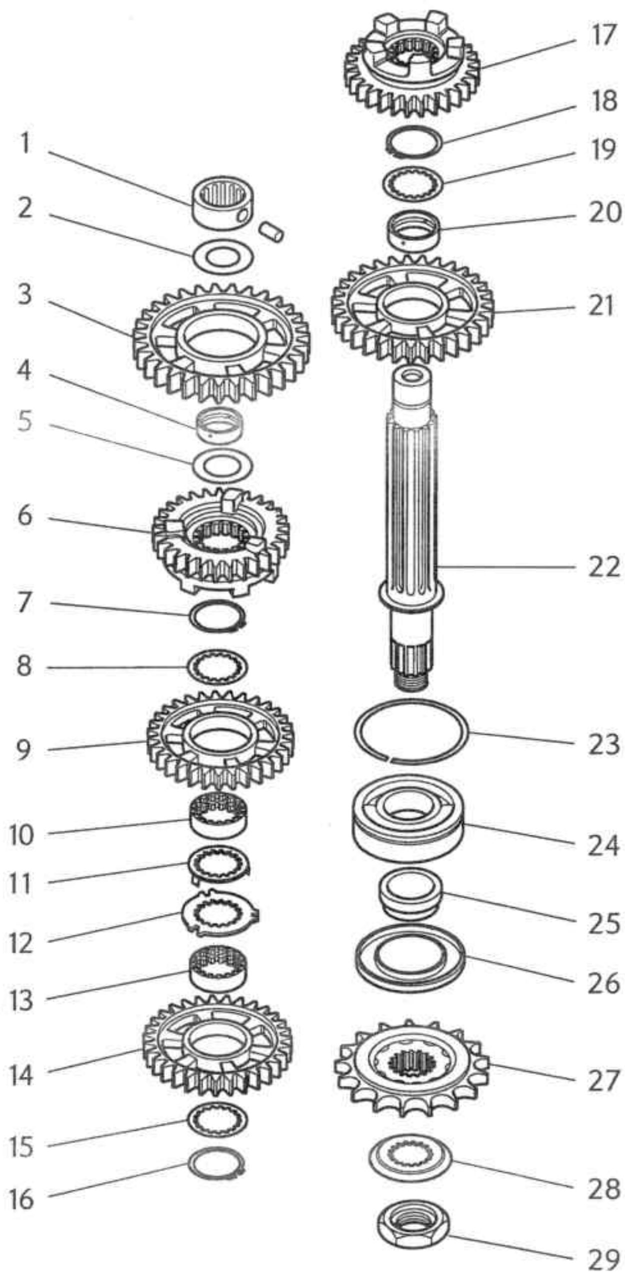
Disassembly

1. Remove the output shaft bearing (1) and plain thrust washer (2).
2. Mark one side of first gear to denote its correct orientation. Remove first gear (3) from the shaft, complete with the plain bush (4) which runs inside the gear.
3. Remove the plain thrust washer (5).
4. Mark one side of fifth gear to denote its correct orientation. Remove fifth gear (6) from the shaft.
5. Remove the circlip (7) and splined thrust washer (8) from in front of fourth gear.
6. Mark one side of fourth gear to denote its correct orientation. Remove fourth gear (9) complete with the splined bush which runs inside the gear (10).
7. Remove the splined lock washers (11 and 12).
8. Mark one side of third gear to denote its correct orientation. Remove third gear (14) off the shaft complete with the splined bush (13) which runs inside the gear.
9. Remove the splined thrust washer (15).
10. Remove the circlip (16) from in front of sixth gear.
11. Mark one side of sixth gear to denote its correct orientation. Remove sixth gear (17) from the shaft.
12. Remove the circlip (18) from in front of second gear.
13. Remove the splined thrust washer (19).
14. Mark one side of second gear to denote its correct orientation. Remove second gear (21) from the shaft, complete with the plain bush (20) which runs inside the gear.
15. Position the output shaft (22) in a vice with soft jaws fitted. Tighten the vice to prevent the shaft from turning and release the tab washer (28) from the output sprocket nut (29), then release the nut.
16. Remove the output sprocket nut (29), tab washer (28) and sprocket (27).
17. Collect the output shaft seal (26).
18. If it is found necessary to replace the large bearing (24) at the end of the shaft, use a press to remove both the bearing and output shaft sprocket spacer (25) together.

Warning

When removing the output shaft bearing, always wear overalls, eye, face and hand protection. The bearing races are hardened and are liable to splinter if broken. Debris from broken bearings could cause injury to eyes, face and any unprotected parts of the body.

Exploded View - Output Shaft



1. Bearing
2. Thrust washer
3. First gear
4. Plain bush
5. Thrust washer
6. Fifth gear
7. Circlip
8. Splined thrust washer
9. Fourth gear
10. Splined bush
11. Lock washer
12. Splined washer
13. Splined bush
14. Third gear
15. Splined washer
16. Circlip
17. Sixth gear
18. Circlip
19. Splined thrust washer
20. Plain bush
21. Second gear
22. Output shaft
23. Snap ring
24. Bearing
25. Sprocket spacer
26. Output shaft seal
27. Output sprocket
28. Tab washer
29. Output sprocket nut

Assembly

Note:

- **The numbers in brackets in the following text refer to the exploded view on page *7-18*.**
- **Lubricate each gear and bush with clean engine oil during assembly.**
- **Examine all gears, bearings and sleeves for damage, chipped teeth and wear beyond the service limits. Replace all suspect components and always use new circlips, a new output shaft seal and a new sprocket tab washer to assemble the shaft.**

Warning

When using a press, always wear overalls, eye face and hand protection. Objects such as bearings frequently 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 injuries to the hand, arms or other parts of the anatomy.

Caution

Bushes and gears with oil holes must always be MISALIGNED with the corresponding oil holes in the output shaft. Reduced oil pressure and gear lubrication may result from alignment of the oil holes, which would cause premature wear of engine and transmission components

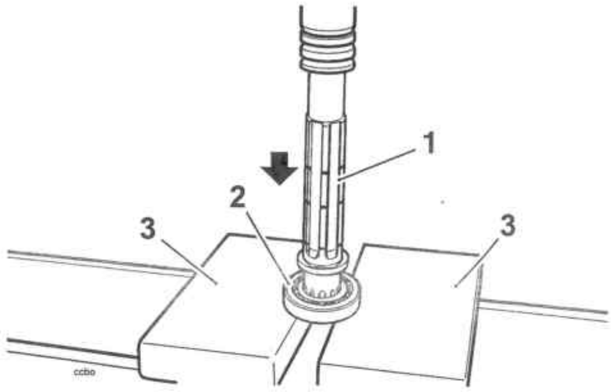
Caution

Removing the output shaft bearing from the shaft will damage the bearing and snap ring. Never re-use removed bearings or snap rings as use of damaged or weakened components could lead to engine and transmission damage.

Caution

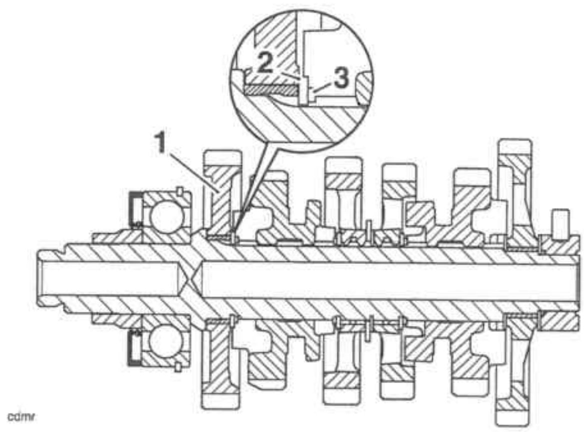
Press only on the bearing inner race to prevent bearing damage.

1. Working from the output sprocket end of the shaft, fit a new bearing (24) and a new sprocket spacer (25) to the shaft using a press and press bars. Fit the sleeve with the large chamfer facing outwards.



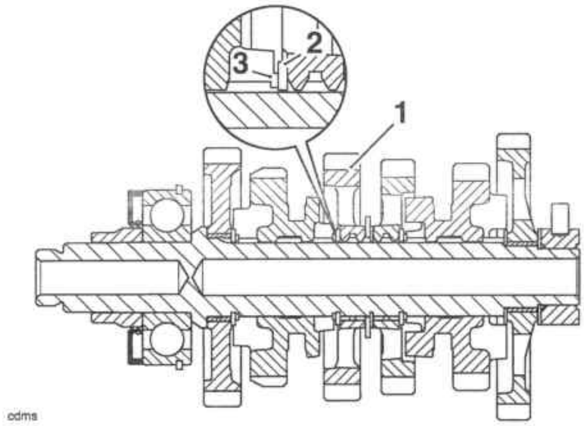
1. Output shaft
2. Bearing
3. Press bars

2. Lubricate and fit a new output shaft seal (26).
3. Transfer the shaft to the vice and secure between soft jaws. Fit the output sprocket (27), new tab washer (28) and nut (29). Apply ThreeBond 1374 to the threads and tighten the nut to **85 Nm**. Close the tab washer.
4. Withdraw the shaft from the vice and continue to assemble from the opposite end to the output sprocket.
5. Fit the plain bush (20) to the shaft.
6. Locate second gear (21) to the shaft as noted during disassembly, with the large step side facing towards the output sprocket end. Fit the splined thrust washer (19) and retain with a new circlip (18) as shown below.



1. Second gear
2. Thrust washer
3. Circlip

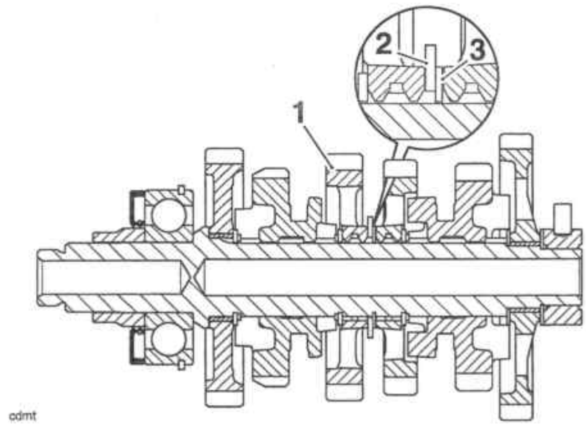
7. Fit sixth gear (17) as noted during disassembly, with the selector fork groove facing away from the output sprocket end. Ensure that the oil holes in the gear DO NOT align with the corresponding oil hole in the output shaft.
8. Fit a new circlip (16) to retain sixth gear. Fit the splined thrust washer (15) to the rear of third gear as shown below.



cdms

1. Third gear
2. Splined thrust washer
3. Circlip

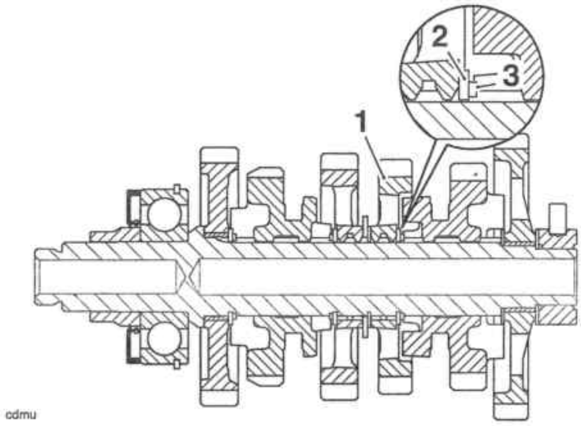
9. Fit the splined bush (13) for third gear. Ensure that the oil holes in the gear DO NOT align with the corresponding oil hole in the output shaft. Fit third gear (14) to the shaft with the large step side facing away from the output sprocket.
10. Fit the splined lock washers (12 and 11), ensuring the tabs in the smaller washer (11) locate in the slots in the larger washer (12) as shown below.



cdmt

1. Third gear
2. Large splined lock washer
3. Small splined lock washer

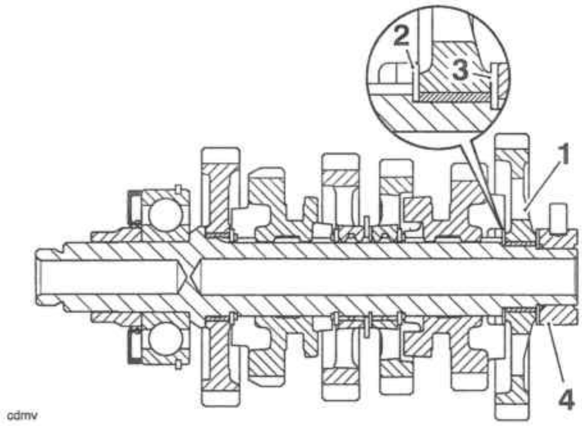
11. Fit the splined bush (10) from fourth gear. Ensure that the oil holes in the gear DO NOT align with the corresponding oil hole in the output shaft.
12. Fit fourth gear (9) as noted during disassembly, with the larger step side facing towards the output sprocket.
13. Fit the splined thrust washer (8) and retain with a new circlip (7) as shown below.



cdmu

1. Fourth gear
2. Splined thrust washer
3. Circlip

14. Fit the fifth gear (6) to the shaft with the groove facing towards the output sprocket. Ensure that the oil holes in the gear DO NOT align with the corresponding oil hole in the output shaft.
15. Fit the first gear thrust washer (5) and plain bush (4).
16. Fit first gear (3) to the shaft as marked during disassembly as shown below.



cdmv

1. First gear
2. Thrust washer
3. Thrust washer
4. Needle roller bearing

17. Finally fit the thrust washer (2) and needle roller bearing (1) to the end of the shaft.

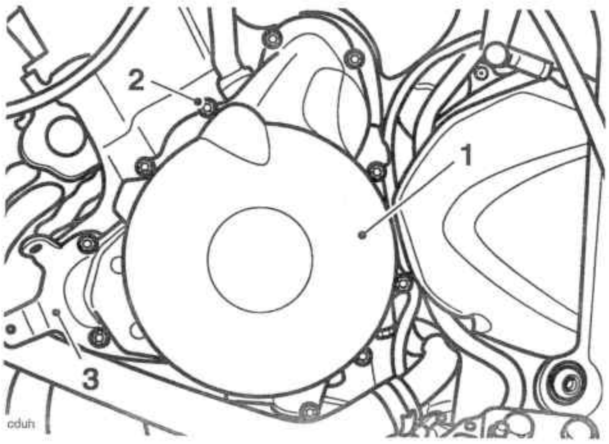
Starter Drive Gears/Sprag Clutch

Removal

Note:

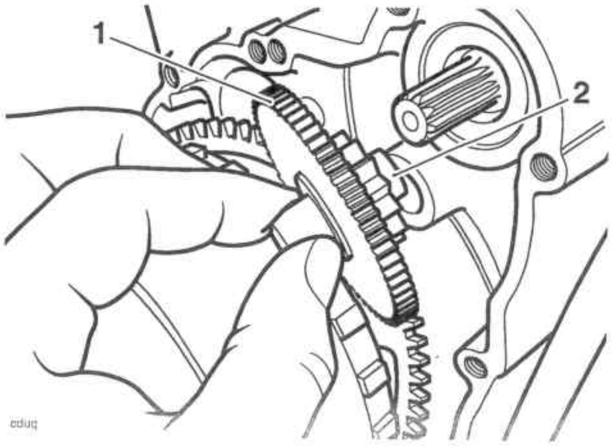
- **The sprag clutch may be detached after first removing the rider's seat and the battery (disconnect the negative (black) lead first). The left hand lower fairing and the alternator must also be removed. Refer to the relevant sections for removal procedures.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the left hand lower fairing (see page *16-13*).
4. Release the bolts securing the left hand engine cover noting the position of the copper washer under the head of one of the upper bolts. Collect the solenoid/fairing bracket from under the front two bolts.
5. Remove the left hand engine cover and position aside.



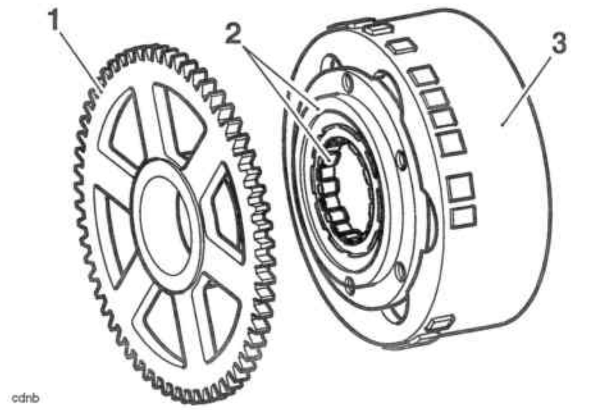
1. Left hand engine cover
2. Copper washer position
3. Solenoid/fairing bracket

6. Withdraw the starter idler gear and shaft, noting the fitted position of the components.



1. Idler gear
2. Idler shaft

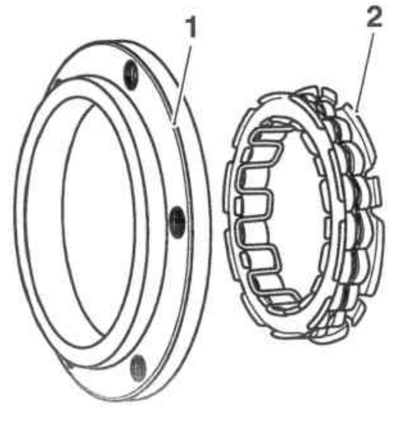
7. Remove the alternator rotor (see page *17-17*).
8. Withdraw the starter drive gear from the sprag clutch.



1. Starter drive gear
2. Sprag clutch/housing
3. Alternator rotor

9. Remove and discard the fixings securing the sprag clutch housing to the alternator rotor. Withdraw the sprag clutch housing.

10. Remove the sprag clutch from the housing.



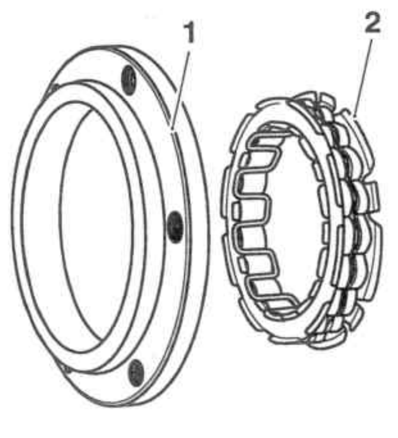
1. Sprag clutch housing
2. Sprag clutch assembly

Inspection

1. Check the sprag clutch bearings for overheating, wear and/or non-smooth operation. Replace the sprag clutch if overheating, wear and/or non-smooth operation is found.
2. Examine all gears for chipped teeth, overheating (going blue) and for any other damage.
3. With the sprag clutch mounted in the housing, check the sprag clutch for smooth, free movement in one direction only (as indicated by the arrow marked on the sprag clutch body).

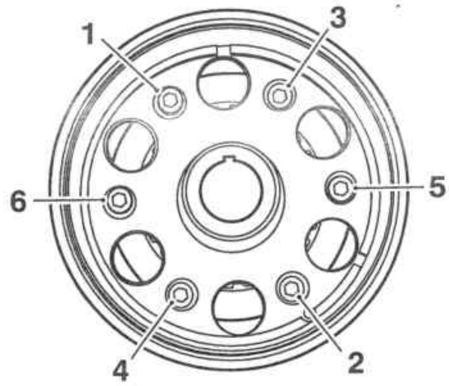
Installation

1. Locate the sprag clutch to the housing as shown below. Push firmly until the lip seats in the recess provided in the housing.



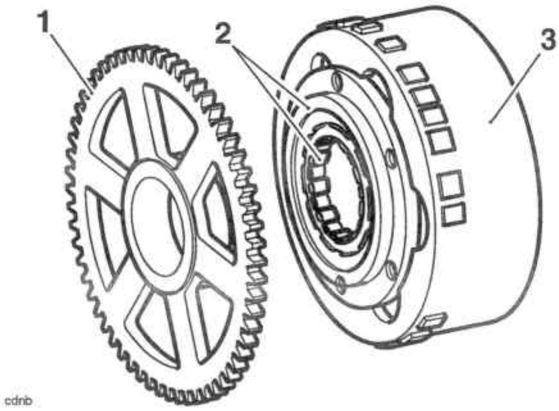
1. Sprag clutch housing
2. Sprag clutch assembly

2. Fit the housing to the alternator rotor.
3. Ensure that the housing is squarely seated and is not jammed on the rotor. Install new fixings.
4. Working in the sequence shown, tighten the bolts to **16 Nm**. Once all six bolts have been tightened, go around again in sequence and recheck each bolt is correctly torqued, if any bolt moves, go around again. Repeatedly check the bolts in sequence until all are correctly torqued and do not move when checked, this will ensure the sprag clutch housing is correctly seated on the rotor.



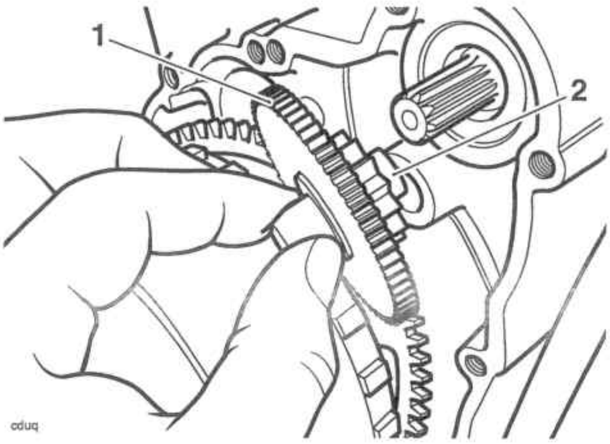
Bolt tightening sequence

5. Fit the starter drive gear to the sprag clutch.



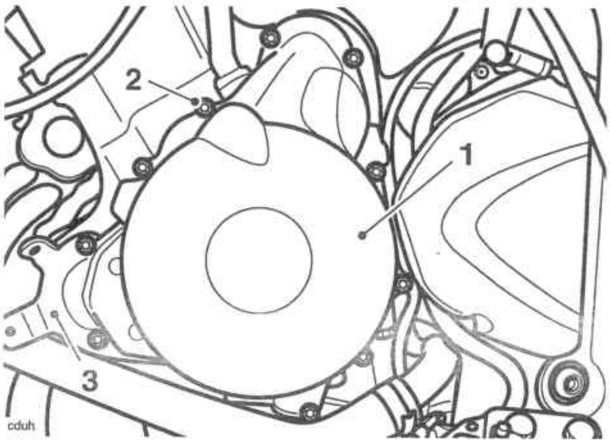
1. Starter drive gear
2. Sprag clutch housing
3. Alternator rotor

6. Refit the alternator rotor (see page *17-19*).
7. Lubricate the idler gear shaft with a 50/50 solution of engine oil and molybdenum disulphide grease.
8. Fit the starter idler gear and shaft to the crankcase.



1. Idler gear
2. Idler shaft

9. Thoroughly clean the left hand engine cover.
10. Position a new gasket to the crankcase dowels then refit the left hand engine cover.
11. Ensure the bolt with the copper washer is correctly located. Refit the solenoid/fairing bracket to the front two bolts. Tighten the cover bolts to **9 Nm**.



1. Left hand engine cover
2. Copper washer position
3. Solenoid/fairing bracket

12. Refit the left hand lower fairing (see page *16-14*).
13. Reconnect the battery, positive (red) lead first.
14. Refit the rider's seat (see page *16-11*)

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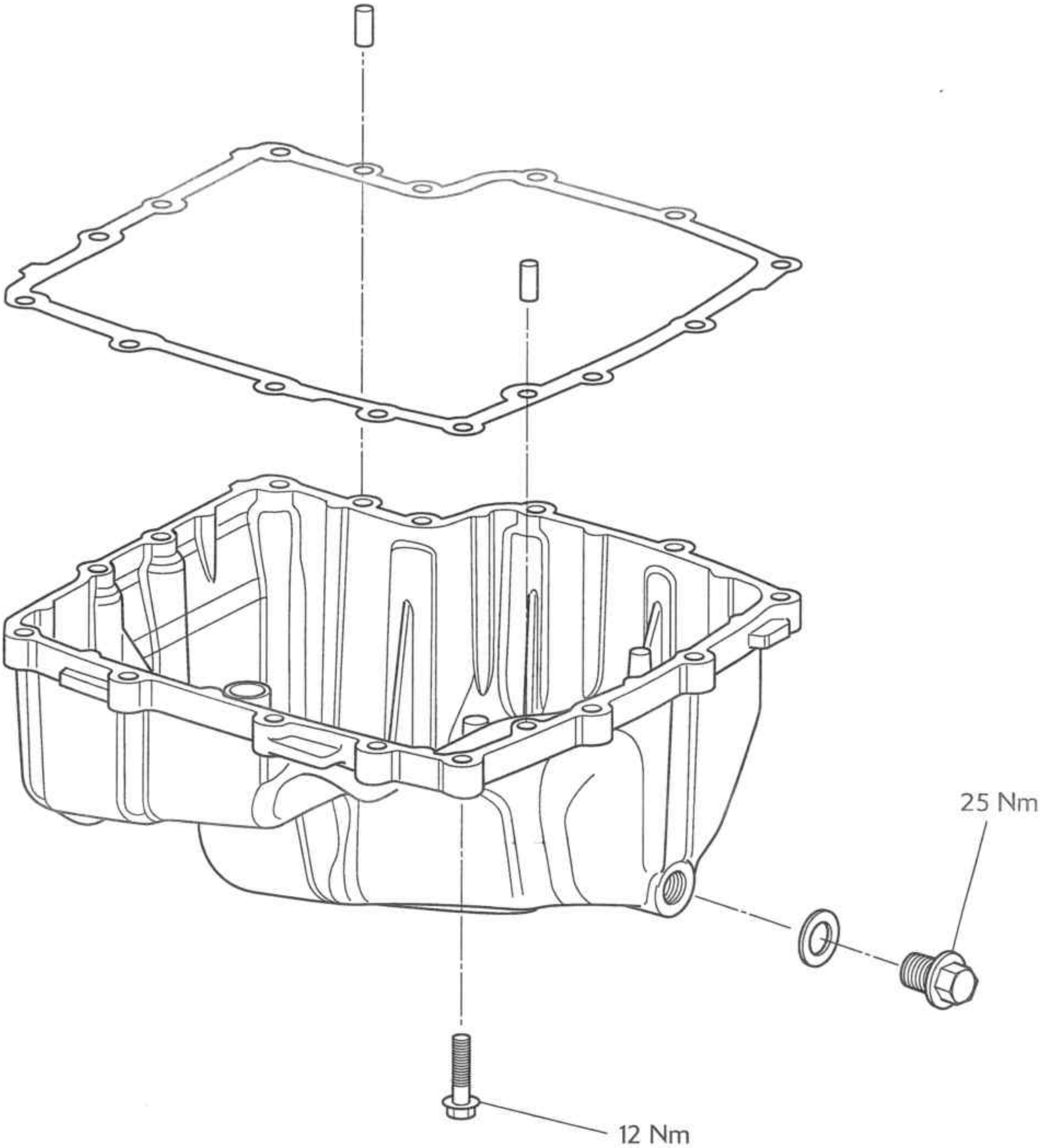
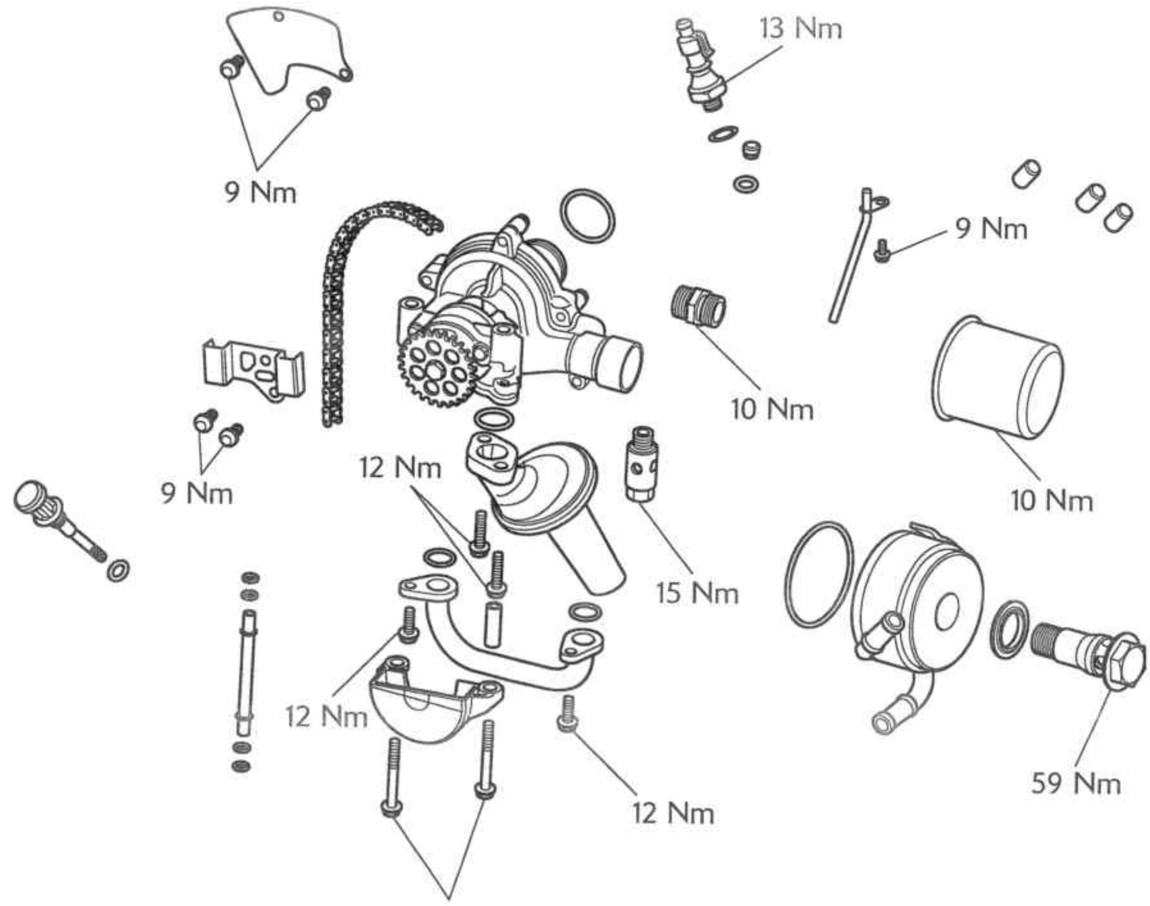
8 Lubrication

Table of Contents

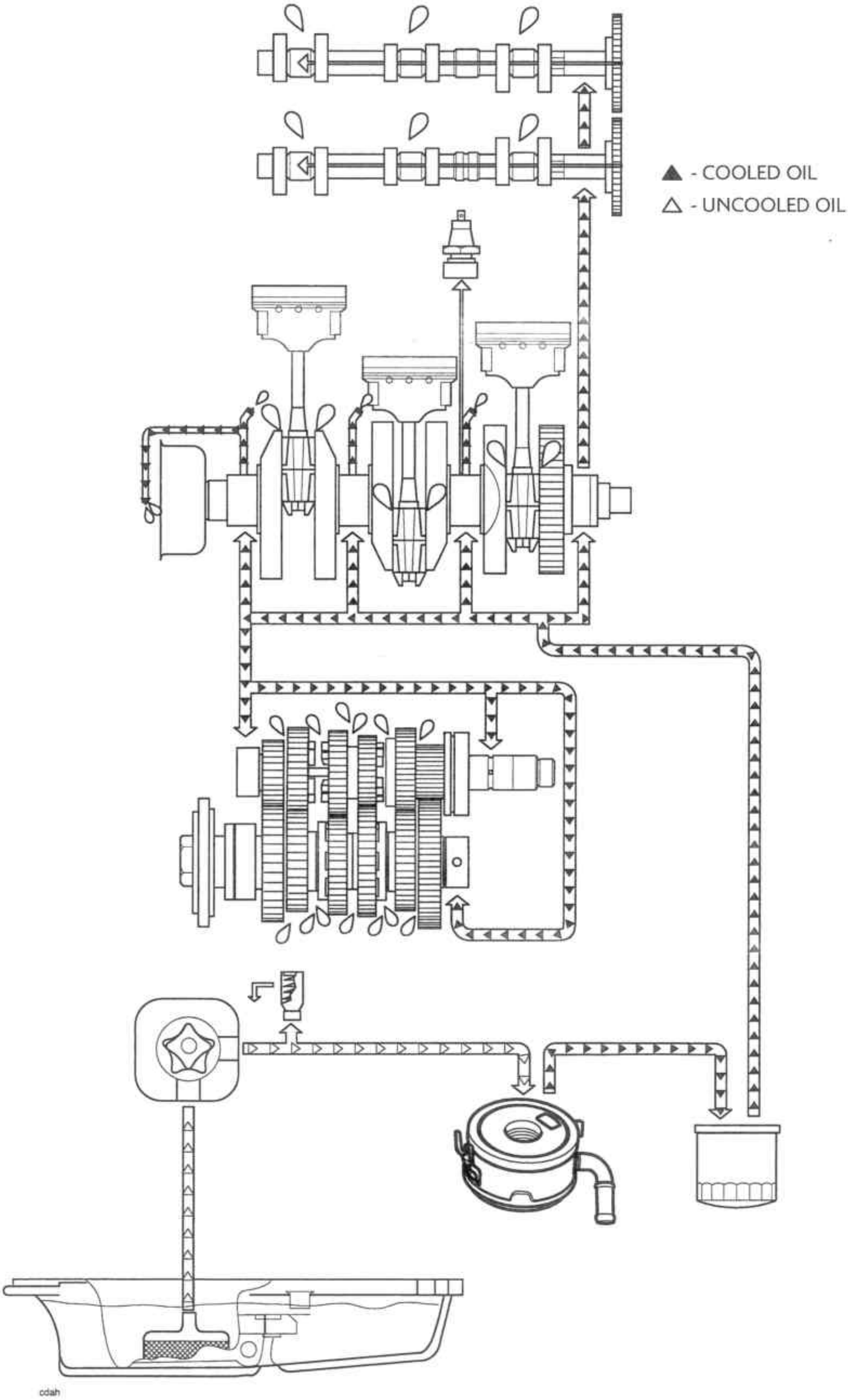
Exploded View - Sump



Exploded View - Oil Pump/Water Pump, Gears and Heat Exchanger



Engine Oil Circuit



Engine Oil Circuit Description

Oil is collected from the sump and is drawn through a mesh strainer into the oil pump rotor. The oil pump is fitted with a single pumping rotor which supplies pressurised oil to the lubrication circuit via the oil pressure relief valve. The relief valve is set to open at 5.1 bar (75 lb/in²) and when open, returns high pressure oil direct to the sump.

Pressurised oil is delivered to the oil to water heat exchanger (mounted on the front of the engine).

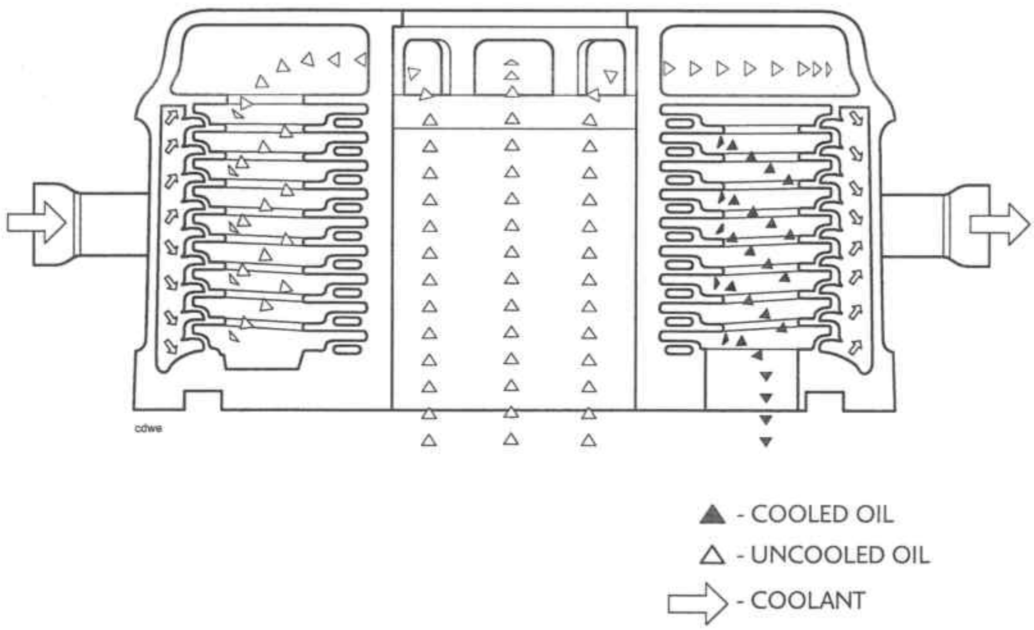
The cooled oil is then delivered to the outside rim of the oil filter, where it is filtered by passing through the filter membrane. Filtered oil is then fed into the lower crankcase gallery. From here is distributed around the engine:

- **Oil is delivered to the crankshaft main bearings and, via drillings in the crankshaft, to the big end bearings.**
- **Spray jets located in the upper crankcase, behind the main bearing shells, lubricate the pistons and connecting rod small ends. These jets are fed oil from the crankshaft oil feed. A low oil pressure warning light switch is also located in the upper crankcase gallery.**
- **Some oil is sent directly to the cylinder head via an internal gallery. Oil that arrives at the cylinder head is fed to both cams via a gallery in the cylinder head casting that delivers oil directly to the sprocket end of the camshafts. Oil is then fed through the hollow camshafts to the other camshaft bearings, the tappet buckets and the valves.**
- **Oil is fed to the gearbox via internal oil pipes and drillings that supply oil directly to the end of each shaft. Oil is circulated along the gearbox shafts to exit holes that feed directly to the bearings, gears and selectors.**

On the Daytona 675, oil is also fed to the alternator to aid cooling of the alternator components. The oil is taken from the crankshaft oil feed and directed to the alternator via a jet, located above the alternator rotor, in the upper crankcase.

Heat Exchanger

The heat exchanger is used to transfer heat from the engine oil into the coolant. Oil is delivered to the heat exchanger via a hollow centre bolt, after which it flows around the end tank and into the heat exchanger core, where it is circulated. Coolant is pumped around the outside of the heat exchanger core to cool the oil. The cooled oil then exits the heat exchanger and flows to the oil filter. An additional benefit of the heat exchanger is that, as the engine coolant reaches its operating temperature more quickly than the engine oil, the oil is heated by the engine coolant at lower engine temperatures; this allows the engine oil to reach its optimum operating temperature more quickly, thereby helping to improve engine oil life, reduce exhaust emissions and reduce engine wear.



Heat Exchanger Circuit

Engine Oil

Specification

Use semi or fully synthetic 10W/40 or 15W/50 motorcycle engine oil which meets specification API SH (or higher) and JASO MA, such as Mobil 1 Racing 4T.

Caution

Triumph high performance fuel injected engines are designed to use semi or fully synthetic motorcycle engine oil which meets specification API SH (or higher) AND JASO MA.

Do not add any chemical additives to the engine oil. The engine oil also lubricates the clutch and any additives could cause the clutch to slip.

Do not use mineral, vegetable, non-detergent oil, castor based oils or any oil not conforming to the required specification. The use of these oils may cause instant, severe engine damage.

Ensure no foreign matter enters the crankcase during an oil change or top-up.

Triumph Engine Oil

Your Triumph Motorcycle is a quality engineered product which has been carefully built and tested to exacting standards. Triumph Motorcycles are keen to ensure that you enjoy optimum performance from your machine and with this objective in mind have tested many of the engine lubricants currently available to the limits of their performance.

Mobil 1 Racing 4T consistently performed well during our tests and has become our primary recommendation for the lubrication of all current Triumph motorcycle engines.

Mobil 1 Racing 4T, specially filled for Triumph, is available from your authorised Triumph dealer.

**Oil level should be between the two raised marks on the dip stick after following step 1to 3,
step 4 is incorrect,
do not fill oil to the top of the hash marks.
This error has been been fixed in 2007 owners manual
but still exists in earlier versions of the
owners manual**

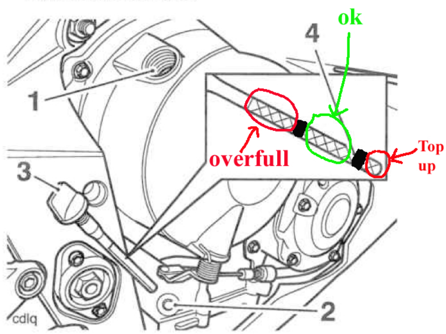
Oil Level Inspection

In order for the engine, transmission, and clutch to function correctly, maintain the engine oil at the correct level, and change the oil and oil filter in accordance with scheduled maintenance requirements.

Warning

Motorcycle operation with insufficient, deteriorated, or contaminated engine oil will cause accelerated engine wear and may result in engine or transmission seizure. Seizure of the engine or transmission may lead to loss of motorcycle control and an accident.

1. Stop the engine, then wait for at least 10 minutes to allow the oil to settle.
2. Remove the dipstick, wipe clean and screw fully home in the crankcase.



1. Filler
2. Dipstick location in crankcase
3. Dipstick
4. Hash marking

Note:

- **The actual level is indicated when the motorcycle is level and upright, not on the side stand, and when the filler has been screwed fully home.**
- **Do not add oil through the dipstick hole in the crankcase.**

3. Remove the dipstick.
4. ~~The oil level is indicated by hash marks on the dipstick. When full, the indicated oil level must be level with the top of the hash marked area.~~
5. If the oil level is too low, remove the filler plug and add oil a little at a time through the filler plug hole in the clutch cover, until the correct level is reached.
6. Once the correct level is reached, fit the dipstick and the filler plug.

Oil and Oil Filter Change

Warning

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

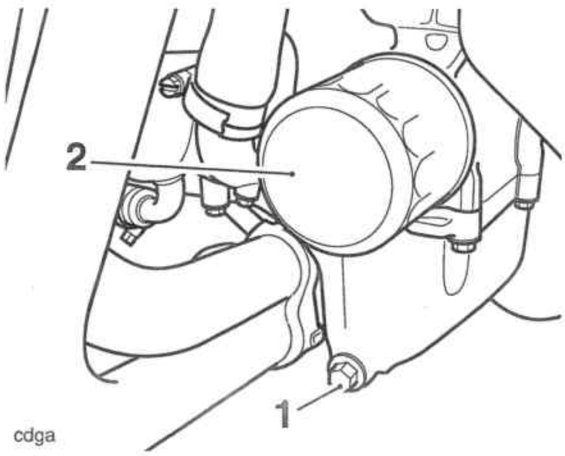
The engine oil and filter must be replaced in accordance with scheduled maintenance requirements.

1. Warm up the engine thoroughly, and then stop the engine.
2. Remove the lower fairings (see page 16-13).
3. Place an oil pan beneath the engine.

Warning

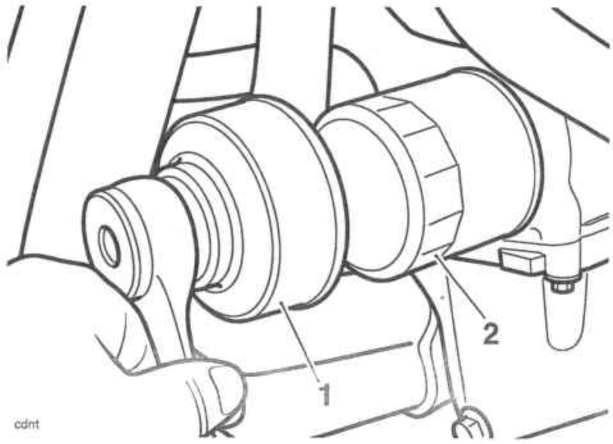
The oil may be hot to the touch. Contact with hot oil may cause the skin to be scalded or burned.

4. Remove the oil drain plug.



1. Oil drain plug
2. Oil filter

5. With the motorcycle on level ground, and on the sidestand, allow the oil to completely drain.
6. Unscrew and remove the oil filter using Triumph service tool T3880312.



1. Oil filter
2. Tool T3880312

7. Discard the oil filter.
8. Apply a smear of clean engine oil to the sealing ring of the new oil filter.
9. Fit the oil filter and tighten to **10 Nm**.
10. After the oil has completely drained out, fit a new sealing washer to the drain plug. Fit and tighten the plug to **25 Nm**.
11. Fill the engine with new oil of the type and grade listed previously and in the specification section.

12. Start the engine and allow to idle.

Caution

Racing the engine before the oil reaches every part can cause engine damage or seizure.

13. Ensure that the oil pressure warning light extinguishes shortly after starting.

Caution

If the engine oil pressure is too low, the low oil pressure warning light will illuminate. If this light stays on when the engine is running, stop the engine immediately and investigate the cause. Running the engine with low oil pressure will cause engine damage.

14. Stop the engine and check the oil level. Adjust if necessary.
15. Refit the lower fairings (see page *16-14*).

Disposal of Used Engine Oil

To protect the environment, do not pour oil on the ground, down sewers or drains, or into water courses. Dispose of used oil sensibly. If in doubt contact your local authority.

Oil Pump

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.

Removal

Note:

- **The oil pump and water pump are supplied as an assembly and cannot be separated. This procedure covers the removal of the oil and water pump assembly.**

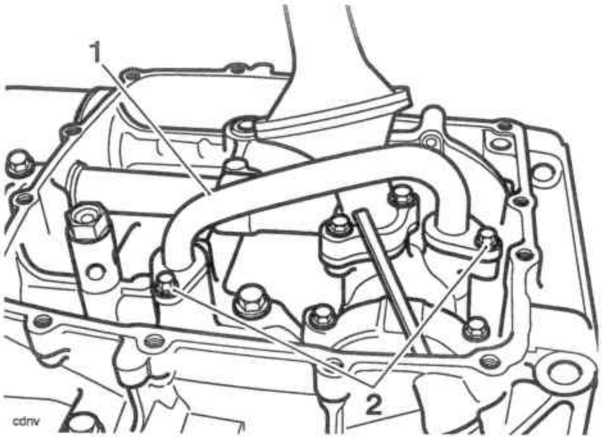
1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Drain the coolant (see page *11-4*).
4. Drain the engine oil (see page *8-7*).

Warning

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

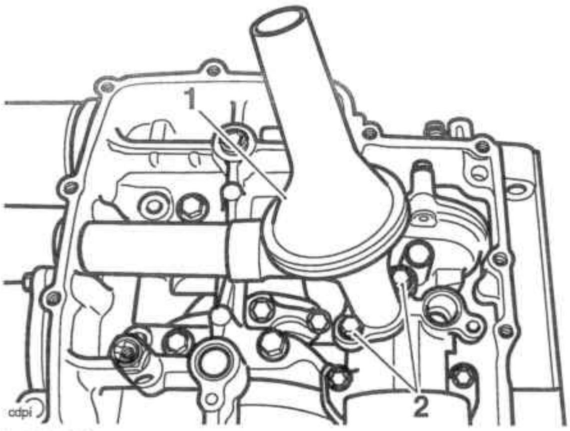
> **⚠ Warning**
>
> Prolonged or repeated contact with engine oil can lead to skin dryness, irritation and dermatitis. In addition used engine oil contains potentially harmful contaminants which can cause cancer. Wear suitable clothing and avoid skin contact.

5. Remove the sump (see page *8-15*).
6. Remove the clutch (see page *4-5*).
7. Release the two fixings and remove the oil transfer pipe. Remove and discard the two O-ring seals.



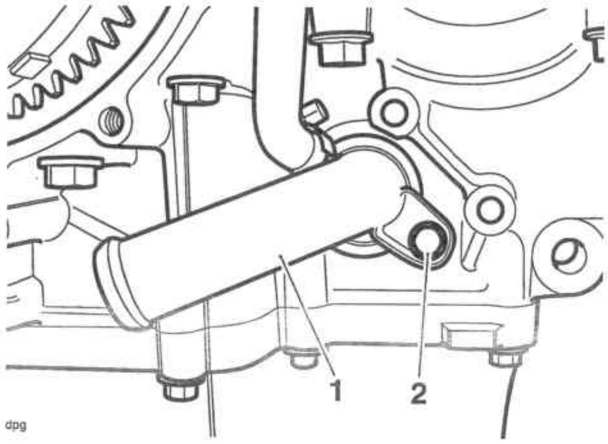
1. Oil transfer pipe
2. Fixings

8. Release the two fixings and remove the oil pick-up. Remove and discard the O-ring seal.



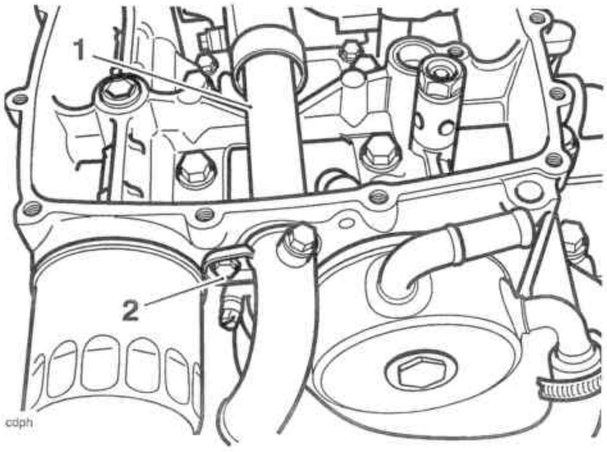
1. Oil pick-up
2. Fixings

9. Release the bolt securing the coolant inlet elbow to the crankcase and withdraw the elbow. Remove and discard the O-ring from the elbow.



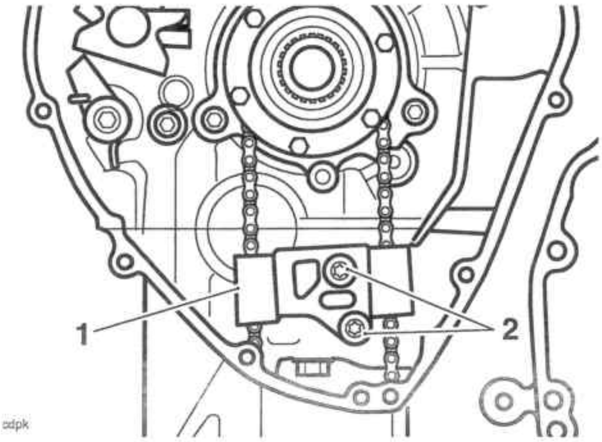
1. Coolant inlet elbow
2. Fixing

10. Release the bolt securing the coolant outlet pipe to the crankcase and withdraw the pipe. Remove and discard the three O-rings from the pipe.



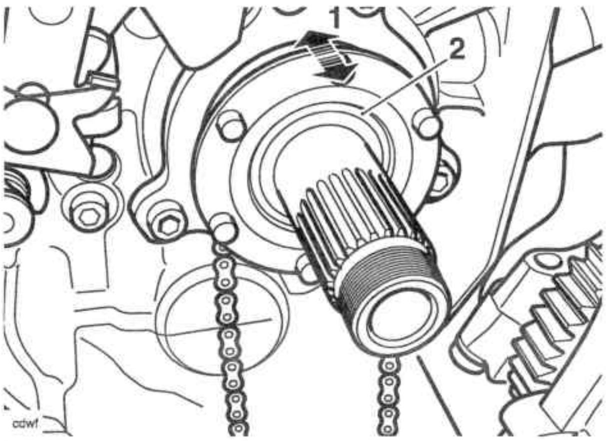
1. Coolant outlet pipe
2. Fixing

11. Release the fixings securing the drive chain guide to the crankcase and remove the guide.



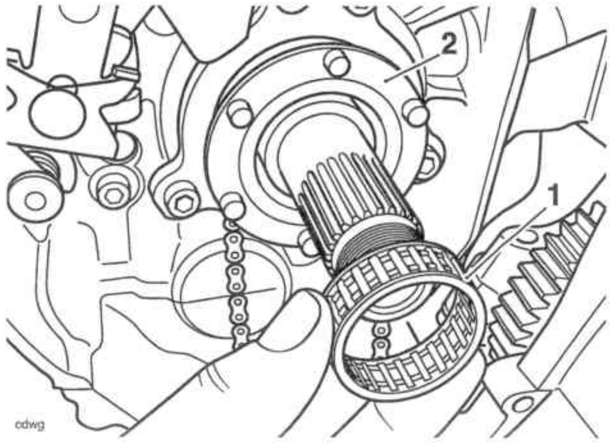
1. Oil pump drive chain guide
2. Fixings

12. Slide the oil pump drive sprocket gently backwards and forwards to dislodge the inner needle roller bearing.



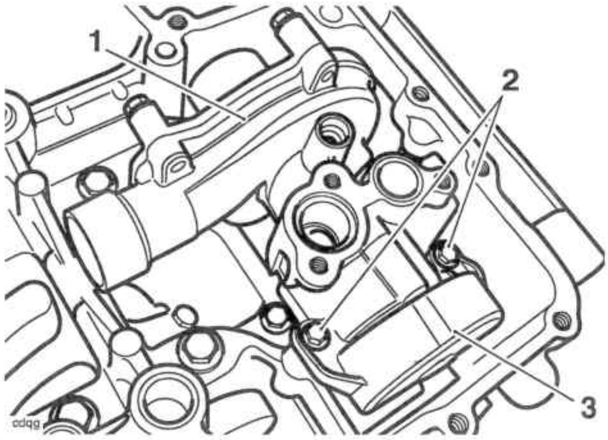
1. Oil pump drive sprocket
2. Needle roller bearing

13. Carefully remove the bearing while supporting the oil pump drive sprocket.



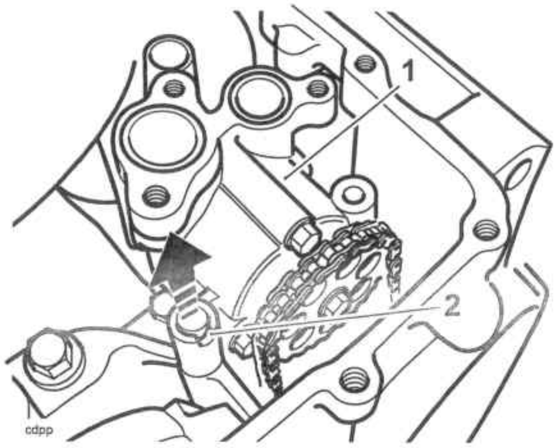
1. Needle roller bearing
2. Oil pump drive sprocket

14. Release the fixings securing the drive chain cover to the oil pump. Remove the drive chain cover.



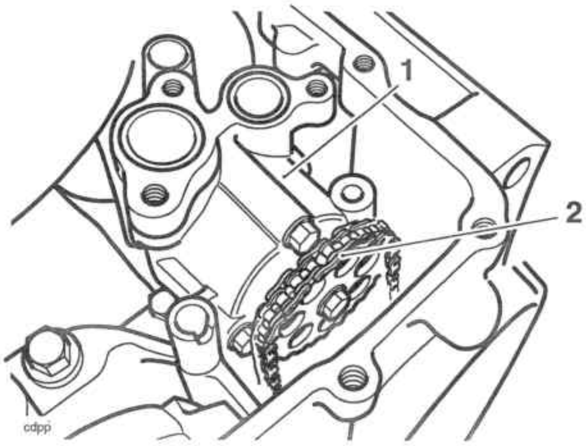
1. Oil pump
2. Fixings
3. Drive chain cover

15. Using a suitable tool, slide the dowel upwards to release the oil pump from the crankcase. It is not necessary to remove the dowel completely from the oil pump.



1. Oil pump
2. Dowel

16. Detach the drive chain from the oil pump.

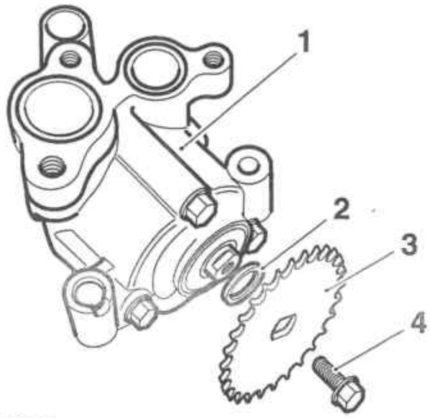


1. Oil pump
2. Drive chain

17. Carefully withdraw the oil pump from the crankcase.
18. Remove and discard the O-ring from the inlet sleeve on the water pump body.

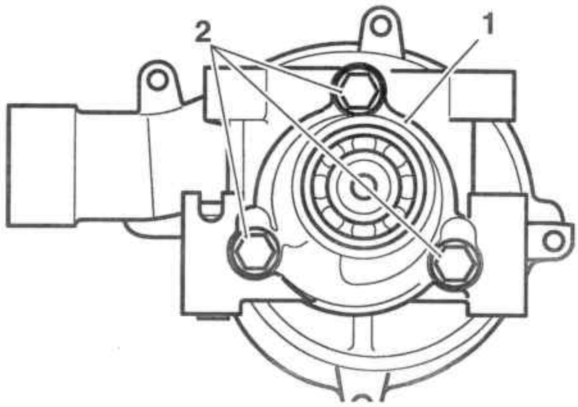
Inspection

1. Release the fixing and remove the drive sprocket and spacer washer.



1. Oil pump
2. Spacer washer
3. Drive sprocket
4. Fixing

2. Release the three fixings and withdraw the oil pump body.



1. Oil pump body
2. Fixings

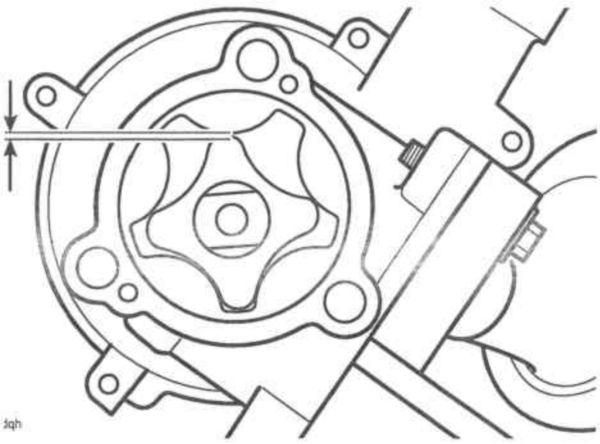
Caution

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.

3. Measure the rotor tip clearance using feeler gauges.

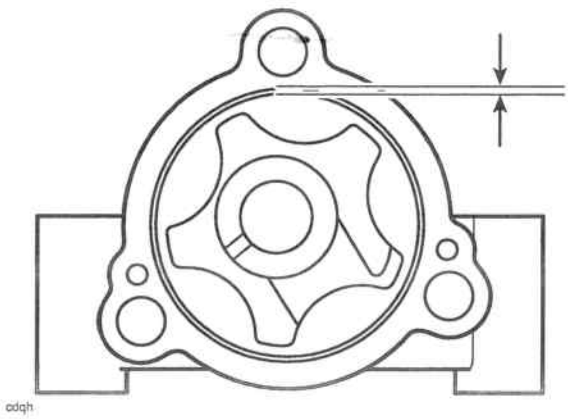
Rotor Tip Clearance

Standard:	0.15 mm
Service limit:	0.20 mm



Rotor Tip Clearance

4. Measure the pump body clearance using feeler gauges.



Pump Body Clearance

Pump Body Clearance

Standard:	0.15 - 0.22 mm
Service limit:	0.35 mm

5. Measure the pump end clearance.

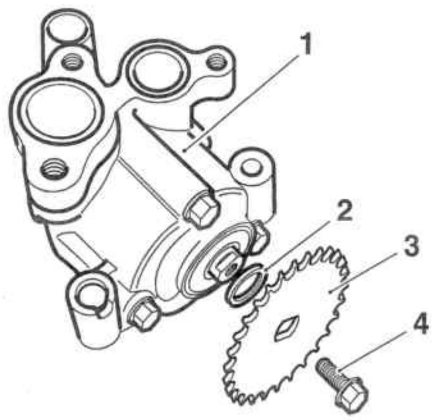
Pump End Clearance

Standard:	0.04 - 0.09 mm
Service limit:	0.17 mm

6. (a) If all clearances are within service limits, liberally apply clean engine oil to all internal components and refit the oil pump body to the oil pump rotor. Apply Loctite 204 to the fixings and tighten to **12 Nm.**

   (b) If any clearance measured is outside the service limits, renew the complete pump.

7. Inspect the sprockets and chain for wear and/or damage. Replace the sprockets and chain if wear and/or damage is found.
8. Check the water pump shaft and shaft bearings for side and end float. Renew if necessary
9. Check for corrosion and scale build-up around the impeller and in the pump body. Renew if necessary.
10. Check the oil pump location dowel for damage. Renew if necessary.
11. Refit the spacer washer and drive sprocket. Apply Loctite 204 to the fixing and tighten to **12 Nm**.



1. Oil pump
2. Spacer washer
3. Drive sprocket
4. Fixing

Installation

Caution

Before fitting the oil pump to the crankcase ensure the pump internal surfaces have been 'wetted' with clean engine oil. The pump may fail to pick-up oil from the sump if the surfaces have not been 'wetted'. This will cause the engine to run without engine oil pressure and will lead to severe engine damage.

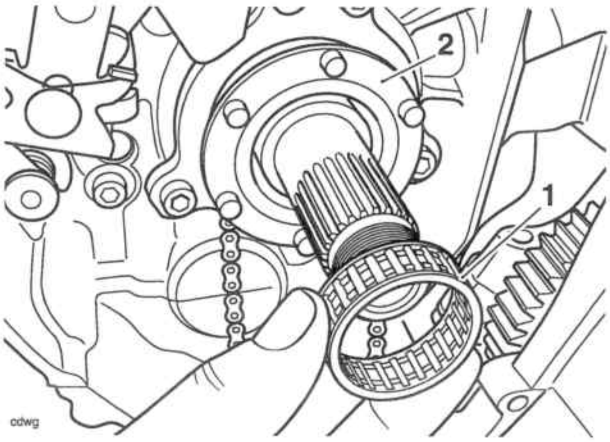
1. Install a new O-ring to the inlet sleeve on the water pump body.
2. Fill the oil pump with new engine oil, turning the pump rotor as the oil is poured in to ensure all surfaces are coated with oil.

3. Position the oil pump to the crankcase and insert the water pump inlet sleeve into the opening in the crankcase.
4. Fit the oil pump to the crankcase, ensuring the oil pump dowel correctly locates into the bolt hole in the crankcase.

Caution

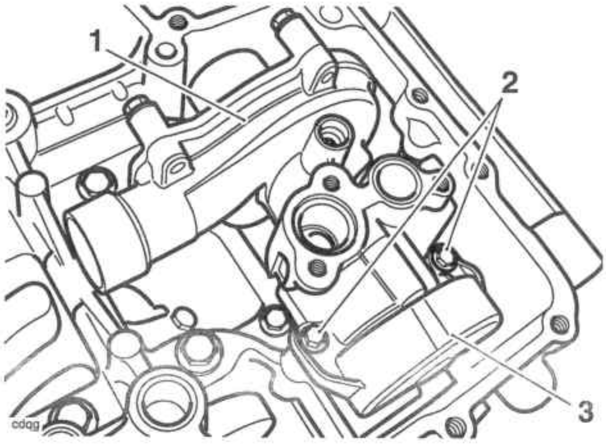
Do not use excessive force to insert the dowel into the crankcase. Severe dowel or crankcase damage may result from the use of excessive force.

5. Using a suitable pin punch, gently tap the dowel downwards into the crankcase until it seats.
6. Feed the drive chain over the transmission input shaft and fit to the sprocket.
7. Fit the drive chain to the sprocket on the oil pump.
8. Support the oil pump drive sprocket and carefully refit the needle roller bearing.



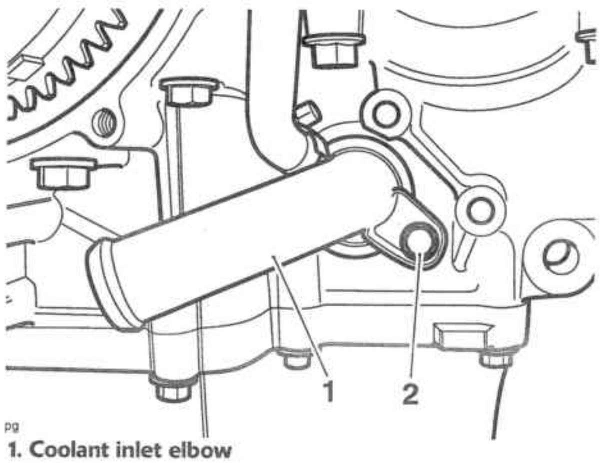
1. Needle roller bearing
2. Oil pump drive sprocket

9. Refit the oil pump drive chain cover to the oil pump and fit new bolts. Tighten the bolts to **12 Nm**.



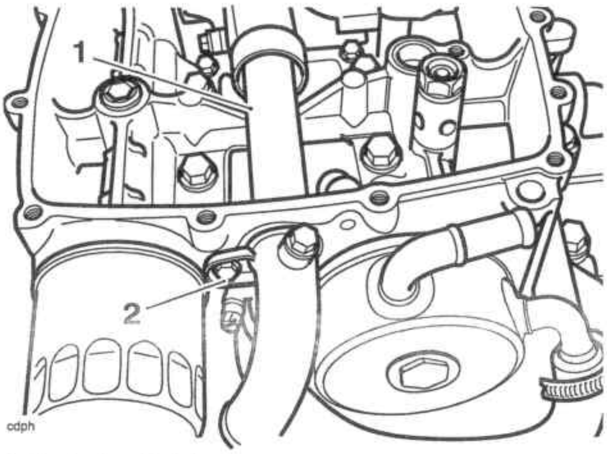
1. Oil pump
2. Fixings
3. Drive chain cover

10. Refit the oil pump drive chain guide. Apply Loctite 204 to the fixings and tighten to **9 Nm**.
11. Install a new O-ring to the coolant inlet elbow and position the elbow to the water pump inlet. Fit the bolt and tighten to **9 Nm**.



1. Coolant inlet elbow
2. Fixing

12. Install three new O-rings to the coolant outlet pipe and position the pipe through the crankcase, locating it to the water pump outlet. Install the fixing and tighten to **9 Nm**.

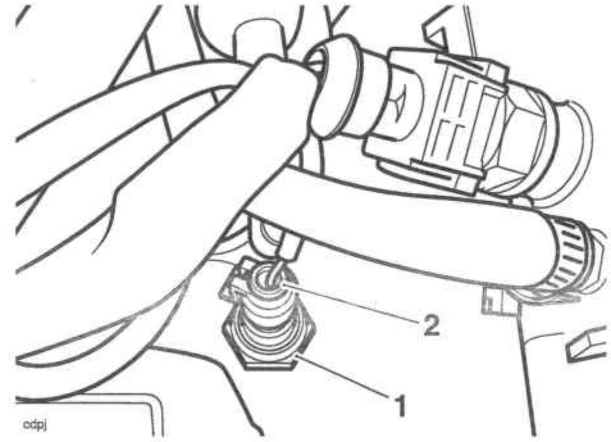


1. Coolant outlet pipe
2. Fixing

13. Install a new O-ring to the oil pick-up and refit the oil pick-up. Fit new bolts and tighten to **8 Nm**.
14. Install two new O-rings to the oil transfer pipe and refit the oil transfer pipe. Fit new bolts and tighten to **6 Nm**.
15. Refit the clutch (see page *4-9*).
16. Refit the sump, ensuring the water pump drain tube is correctly installed (see page *8-16*).
17. Reconnect the battery, positive (red lead) first.
18. Refit the rider's seat (see page *16-11*).
19. Refill the engine with oil (see page *8-7*).
20. Refill the cooling system (see page *11-5*).

Low Oil Pressure Warning Light Switch

The low oil pressure warning light switch is located in the upper crankcase, behind the cylinder head.



1. Low oil pressure warning light switch
2. Electrical connection

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Disconnect the electrical connection to the switch.
4. Remove the switch and collect the copper washer.

Installation

1. Incorporating a new copper washer, fit the switch and tighten to **13 Nm**.
2. Refit the electrical connection.
3. Reconnect the battery, positive (red) lead first.
4. Refit the rider's seat (see page *16-11*).

Sump

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Drain the engine oil (see page *8-7*).

Warning

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

Warning

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

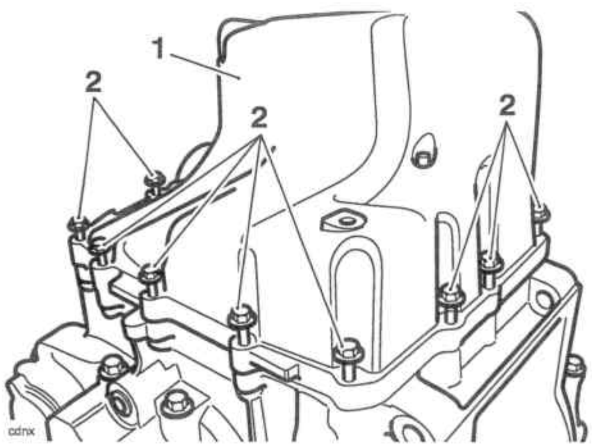
4. Remove the exhaust system (see page *10-129*).

Warning

The exhaust system will be hot if the engine has recently been running. Always allow sufficient time for the exhaust to cool before working on or near the exhaust system.

Contact with a hot exhaust could result in burn injuries.

5. Release the bolts securing the sump to the lower crankcase.

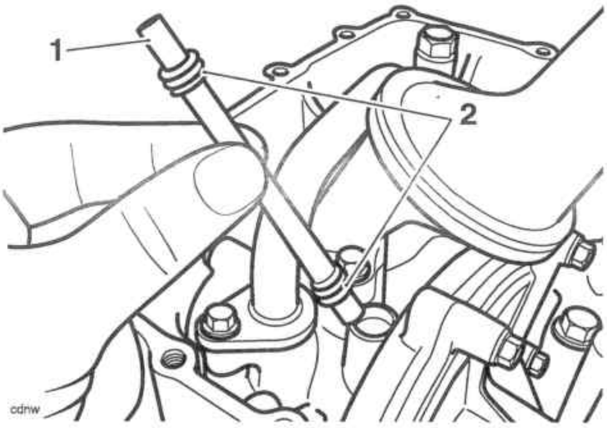


1. Sump
2. Fixings

6. Detach the sump and collect the water pump drain tube. Remove and discard the four drain tube O-rings

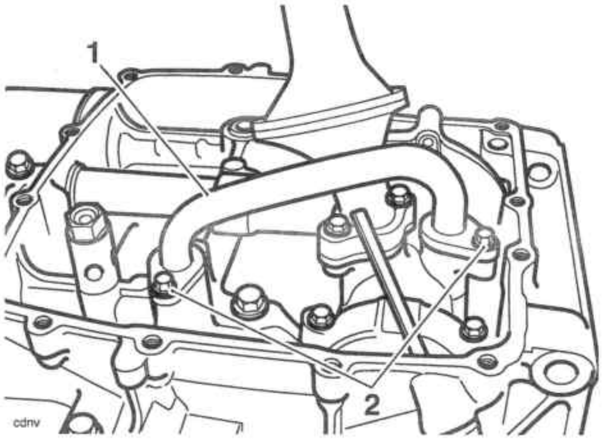
Note:

- **The water pump drain tube may remain attached to the water pump or become detached with the sump.**



1. Water pump drain tube
2. O-rings

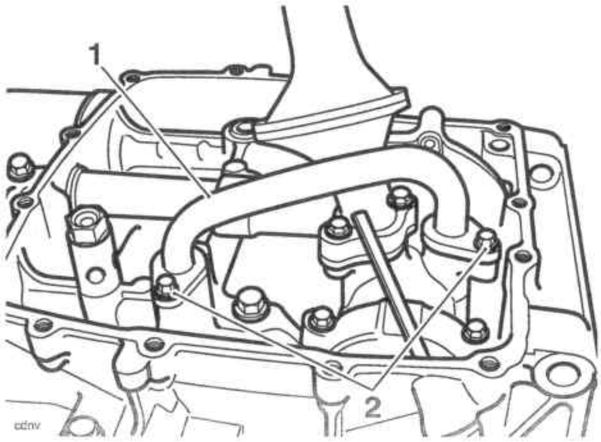
7. Remove and discard the sump gasket.
8. If necessary, release the oil transfer pipe fixings and remove the oil transfer pipe. Remove and discard the two O-rings from the crankcase.



1. Oil transfer pipe
2. Fixings

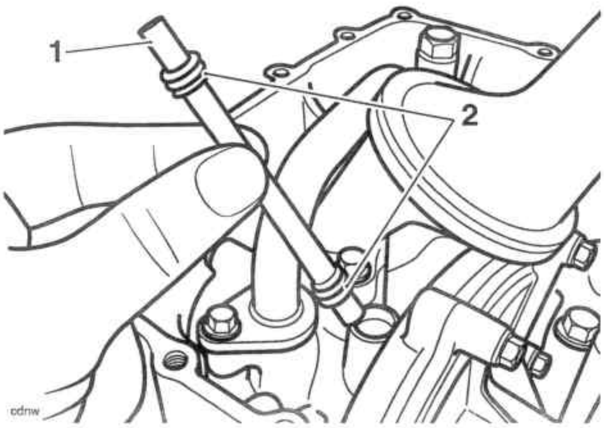
Lubrication

Installation



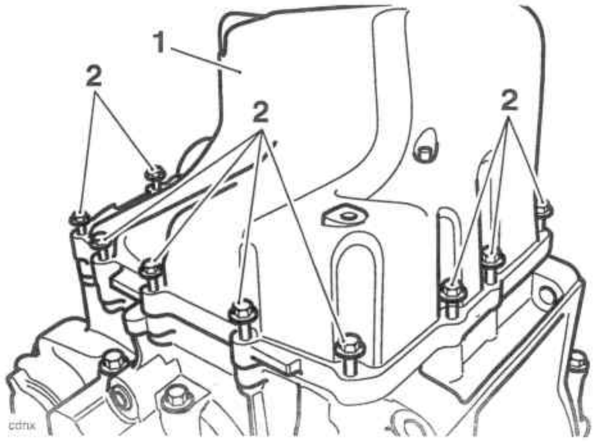
1. Oil transfer pipe
2. Fixings

1. If removed, fit the oil transfer pipe incorporating new O-rings. Tighten the fixings to **6 Nm**.
2. Incorporating new O-rings, position the water pump drain tube to the oil pump.



1. Water pump drain tube
2. O-rings

3. Incorporating a new sump gasket, position the sump to the lower crankcase.
4. Tighten the sump fixings to **12 Nm**.



1. Sump
2. Fixings

5. Refit the exhaust system (see page *10-132*).

Note:

- **Use new exhaust gaskets at the downpipe connections with the cylinder head.**

6. Fill the engine with the correct grade of engine oil (see page *8-6*).
7. Reconnect the battery, positive (red) lead first.
8. Start the engine and ensure that the low oil pressure warning light goes out shortly after starting.
9. Stop the engine and check the engine oil level. Adjust if necessary (see page *8-6*).
10. Refit the lower fairings (see page *16-13*).
11. Refit the rider's seat (see page *16-11*).

Heat Exchanger

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the lower fairings (see page *16-13*).
4. Drain the coolant (see page *11-4*).
5. Drain the engine oil (see page *8-7*).

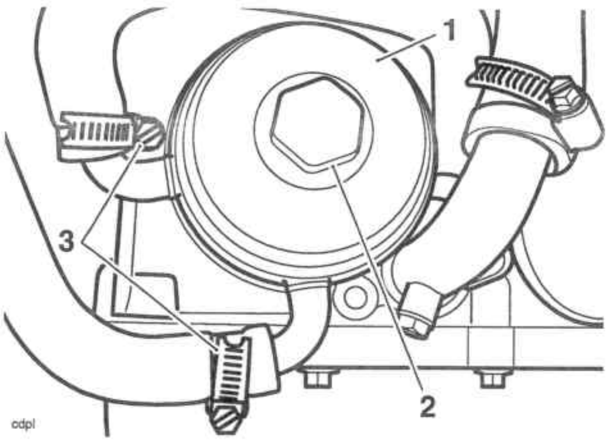
Warning

The oil may be hot to the touch. Contact with hot engine oil may cause skin to be scalded or burnt.

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.

6. Disconnect the coolant hoses from the heat exchanger.
7. Remove the centre bolt from the heat exchanger and withdraw it from the crankcase. Remove and discard the heat exchanger O-ring and the centre bolt sealing washer.



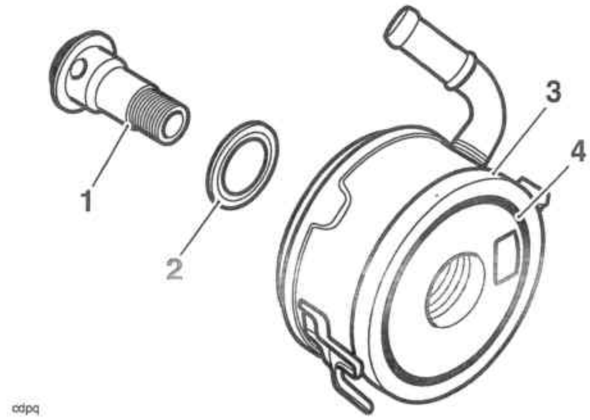
1. Heat exchanger
2. Centre bolt
3. Coolant hose clips

Inspection

1. Check the heat exchanger body for corrosion and/or damage.

Installation

1. Fit a new O-ring to the heat exchanger, and a new sealing washer to the centre bolt.



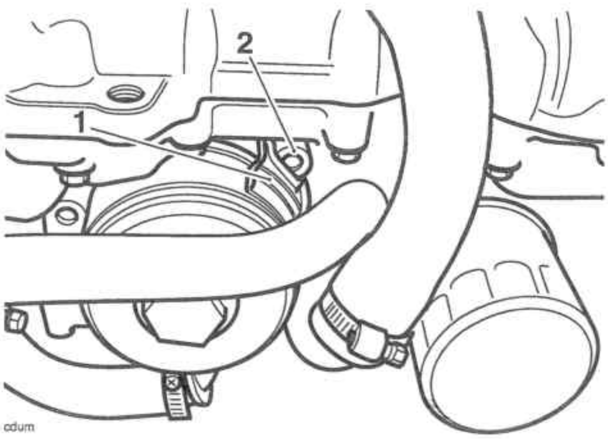
1. Centre bolt
2. Sealing washer
3. Heat exchanger
4. O-ring

Note:

- **To ensure correct positioning, ensure that the tab on the heat exchanger locates in the boss provided in the crankcase.**

Caution

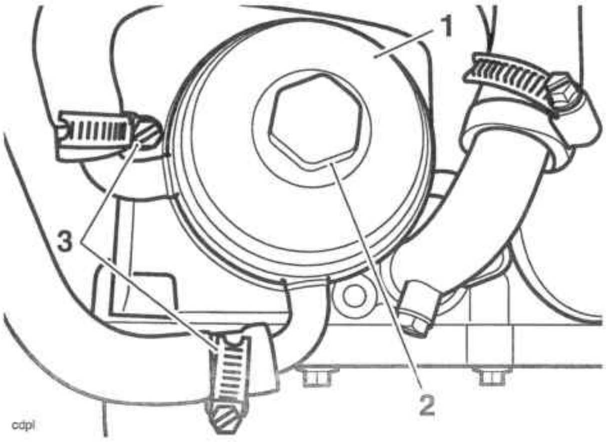
Do not rely on the tab to hold the heat exchanger in position while tightening the centre bolt. The tab will bend and will not prevent the heat exchanger from turning. Instead, firmly hold the heat exchanger in position by hand.



1. Heat exchanger tab
2. Crankcase boss

2. Fit the heat exchanger to the crankcase and tighten the centre bolt to **59 Nm**.

3. Fit the coolant hoses to the heat exchanger and tighten the coolant hose clips.



1. Heat exchanger
2. Centre bolt
3. Coolant hoses

4. Refill the cooling system (see page *11-5*).
5. Refill the engine with oil (see page *8-7*).
6. Reconnect the battery, positive (red) lead first.
7. Start the engine and check for oil leaks. Once a leak check has been made, stop the engine and allow to stand for 10 minutes.
8. Adjust the engine oil level (see page *8-6*).
9. Refit the rider's seat (see page *16-11*).

9 Engine Removal/Refit

Table of Contents

Engine Removal/Refit

Removal

1. Remove the seats (see page *16-11*).
2. Disconnect the battery, negative (black) lead first and remove the battery (see page *9-2*).
3. Place the motorcycle on a paddock 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.

4. Remove the rear panel (see page *16-12*).
5. Remove the lower fairings (see page *16-12*).
6. Remove the fuel tank (see page *10-106*).
7. Remove the airbox (see page *10-110*).
8. Remove the throttle bodies (see page *10-117*).
9. Drain the engine oil (see page *8-7*).
10. Drain the coolant (see page *11-6*).
11. Remove the radiator (see page *11-8*).

Note:

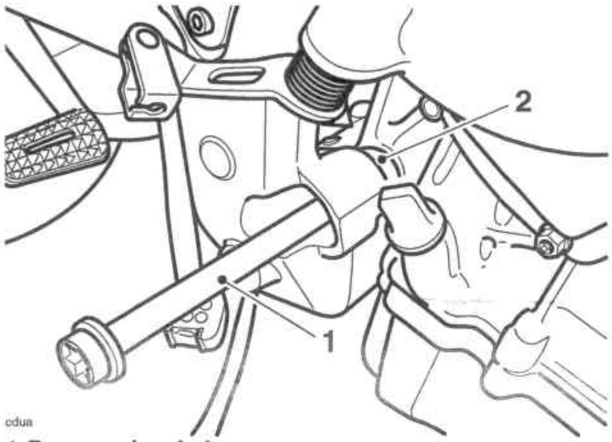
- **Secure the coolant hoses to prevent damage as the engine is removed.**

12. Remove the exhaust system completely (see page *10-129*).
13. Set the drive chain adjustment to allow maximum free play in the chain (see page *12-6*).
14. Disconnect the gearchange linkage at the gearbox shaft.
15. Remove the sprocket cover.

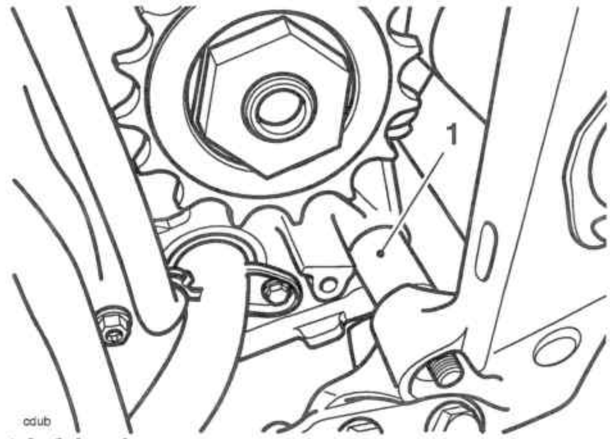
Caution

To prevent chain damage, do not allow the chain to come into contact with dirt, road grit etc.

16. Disconnect all electrical connections from the main harness to the engine.
17. Disconnect the clutch cable (see page *4-5*).
18. Place a support beneath the engine and ensure that the frame is still adequately and securely supported.
19. Note the position of the two spacers installed to the lower gearbox bolt, one on either side of the engine.
20. Release the nuts securing the rear gearbox mounting bolts and remove the two bolts. Collect the two spacers from the lower bolt.



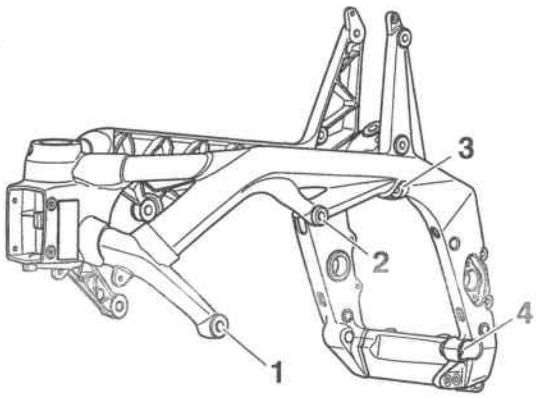
1. Rear gearbox bolt
2. Right hand spacer



1. Left hand spacer

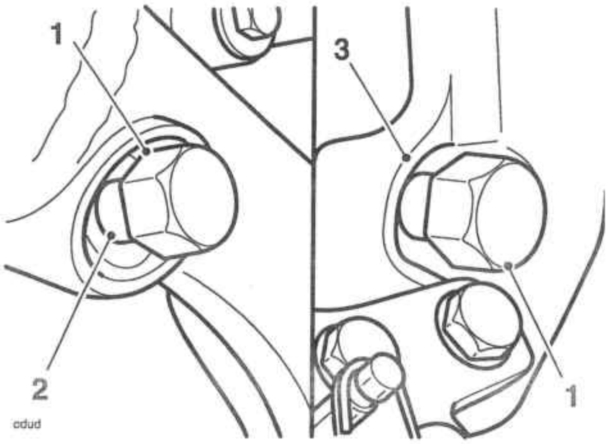
Note:

- **The frame is fitted with four frame adjuster sleeves, located on the left hand side of the frame, as shown below.**



1. Front frame adjuster position
2. Centre frame adjuster position
3. Rear upper frame adjuster position
4. Rear lower frame adjuster position

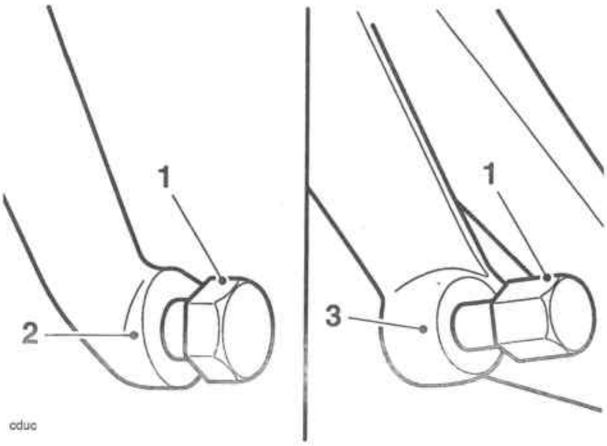
21. Using tool T3880103, slacken the two rear frame adjuster sleeves.



1. Tool T3880103
2. Rear upper frame adjuster
3. Rear lower frame adjuster

22. Release the nuts securing the left hand centre and front engine mounting bolts and remove the bolts.

23. Using tool T3880103, slacken the centre and front frame adjuster sleeves.



1. Tool T3880103
2. Front frame adjuster
3. Centre frame adjuster

24. Remove the two remaining (right hand) engine mounting bolts and lower the engine sufficiently to allow the drive chain to be detached from the output sprocket.
25. Remove the engine from the frame.

Caution

To prevent damage to components, lower the engine very carefully.

Installation

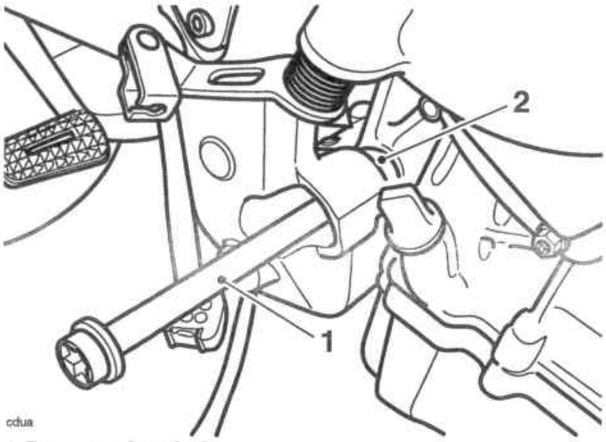
1. Position the engine beneath the frame.
2. Raise the engine, looping the drive chain over the output sprocket as it is raised.

Caution

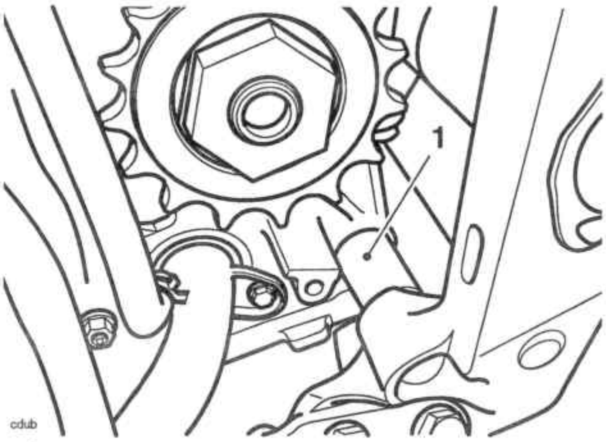
Unless the following engine mounting bolt installation/tightening sequence is precisely followed, severe frame damage can occur.

3. Align the engine to the frame and carefully fit the right hand centre engine mounting bolt (located at the rear of the cylinder head) ensuring the engine is still adequately and securely supported.
4. Align the left hand centre engine mounting and using tool T3880103, tighten the frame adjuster to **3 Nm**. Carefully fit the bolt but do not fully tighten at this stage.

5. Temporarily insert the lower rear (gearbox) bolt from the right hand side, ensuring the two spacers are installed as noted during removal.
   The bolt should only be inserted far enough to support the two spacers, as fully inserting the bolt will restrict access the frame adjuster sleeve. Do not fit the nut.



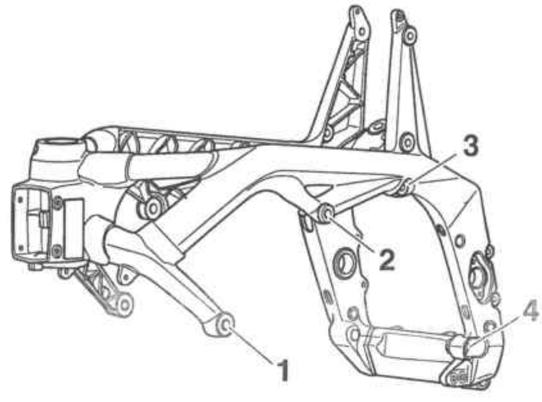
1. Rear gearbox bolt
2. Right hand spacer



1. Left hand spacer

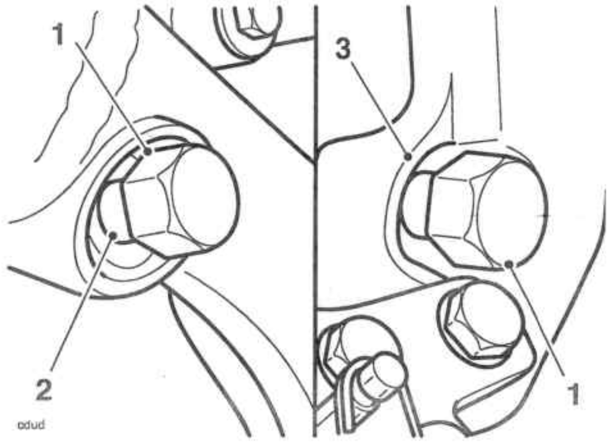
Note:

- **The frame is fitted with four frame adjuster sleeves, located on the left hand side of the frame, as shown below.**



1. Front frame adjuster position
2. Centre frame adjuster position
3. Rear upper frame adjuster position
4. Rear lower frame adjuster position

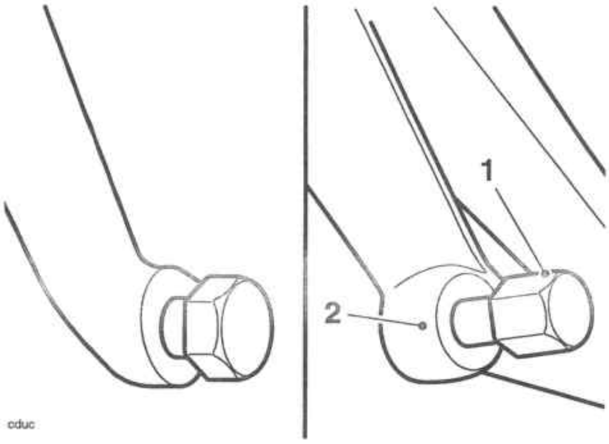
6. Using tool T3880103, tighten the two rear frame adjuster sleeves to **3 Nm**.



1. Tool T3880103
2. Rear upper frame adjuster
3. Rear lower frame adjuster

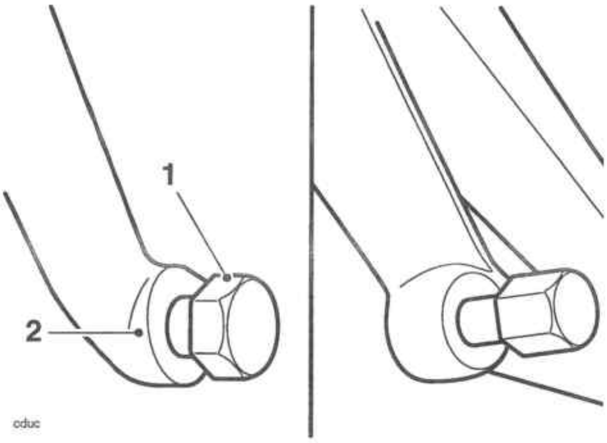
7. Fit the right hand front bolt (located at the front of the cylinder head), fit a new nut and tighten to **48 Nm.**

8. Remove the left hand centre engine mounting bolt fitted earlier and recheck the torque on the frame adjuster, using tool T3880103. Re-tighten the adjuster to **3 Nm**. Refit the bolt, and tighten to **48 Nm**.



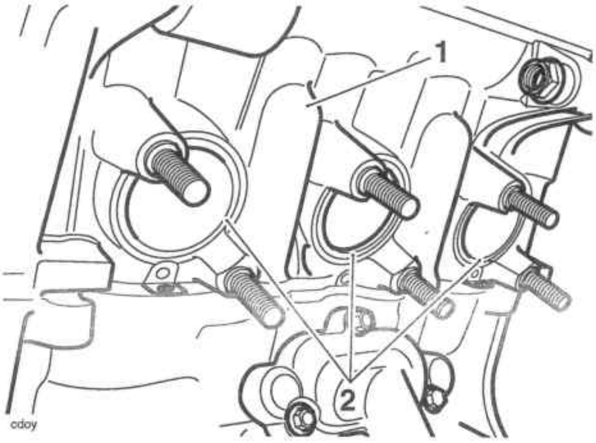
1. Tool T3880103
2. Centre frame adjuster

9. Tighten the right hand centre bolt to **48 Nm**.
10. Remove the lower rear (gearbox) bolt from the right hand side and insert it from the left hand side. Fit a new nut and tighten to **48 Nm**.
11. Using tool T3880103, tighten the front frame adjuster to **3 Nm**.



1. Tool T3880103
2. Front upper frame adjuster

12. Fit the upper rear (gearbox) bolt from the left hand side. Fit a new nut and tighten to **48 Nm**.
13. Fit the left hand front bolt and fit a new nut. Tighten to **48 Nm**.
14. Remove the support from beneath the engine.
15. Refit the clutch cable (see page *4-6*).
16. Reconnect all electrical connections to the engine.
17. Set the drive chain adjustment (see page *12-6*).
18. Refit the gearchange linkage.
19. Refit the sprocket cover and tighten the bolts to **9 Nm**.
20. Using new seals at the cylinder head, refit the exhaust system (see page *10-132*).



1. Cylinder head
2. Seals

21. Refit the radiator (see page *11-10*).
22. Fill the engine with oil of the correct grade and viscosity (see page *8-7*).
23. Refit the throttle bodies (see page *10-120*).
24. Check the throttle cable adjustment (see page *10-116*).
25. Refit the airbox (see page *10-110*).
26. Refit the fuel tank (see page *10-105*).
27. Refit the lower fairings (see page *16-12*).
28. Refit the rear body panel (see page *16-12*).
29. Refit the battery to the battery box and reconnect, positive (red) lead first (see page *17-7*).
30. Refill the cooling system (see page *11-5*).
31. Remove the motorcycle from the paddock stand and place on the side stand.
32. Refit the seats (see page *16-11*).

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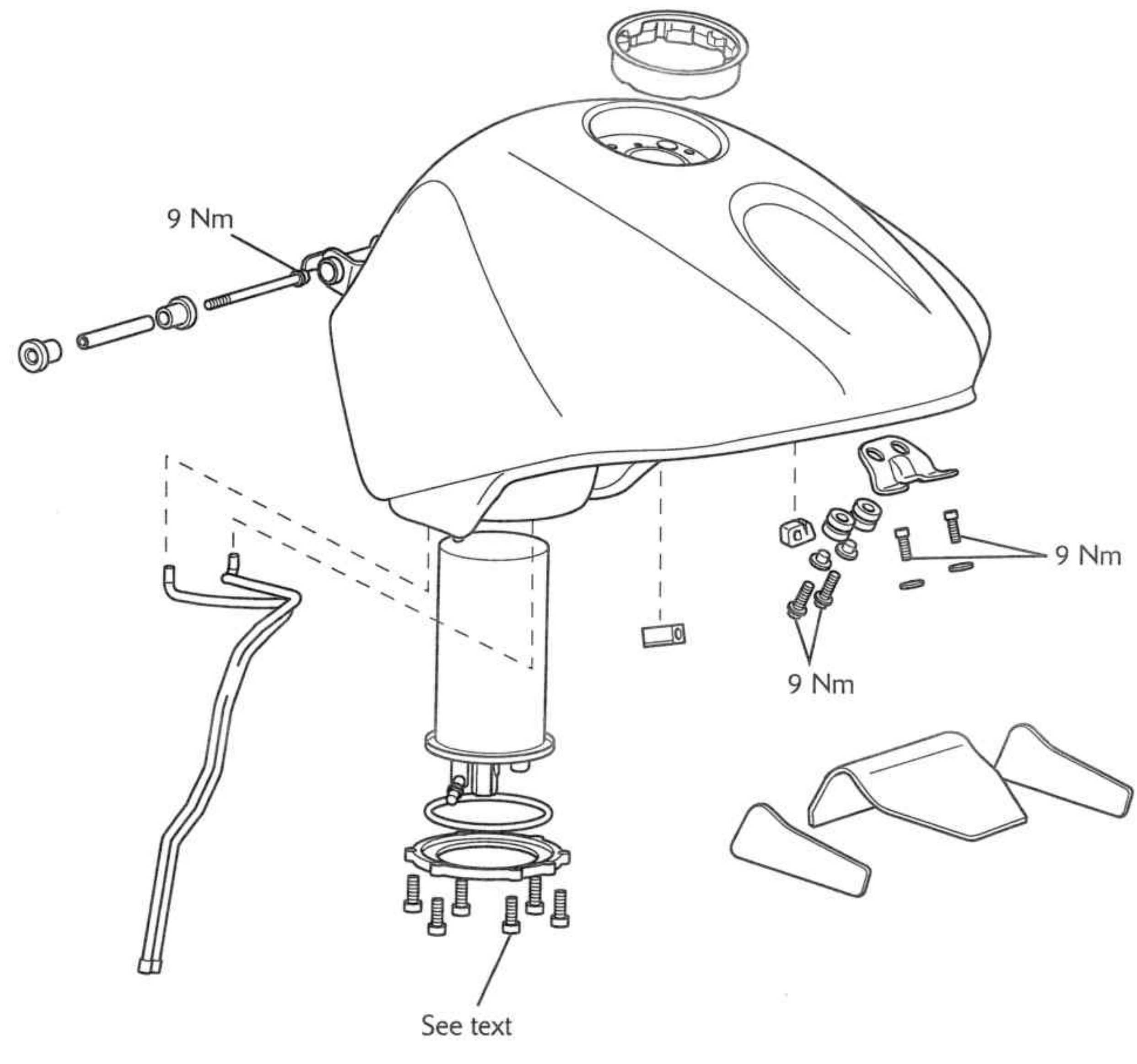
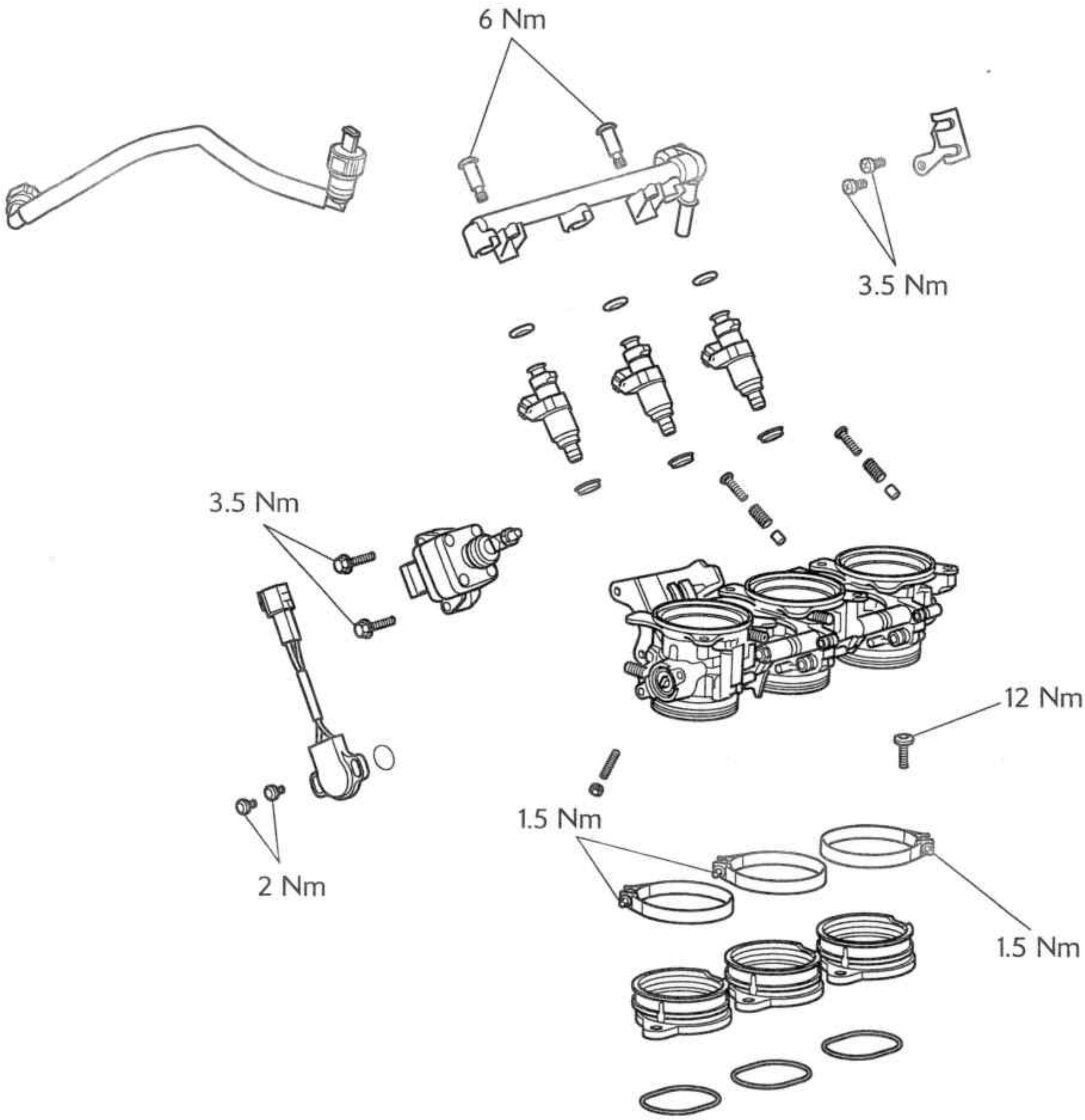
10 Fuel System/Engine Management

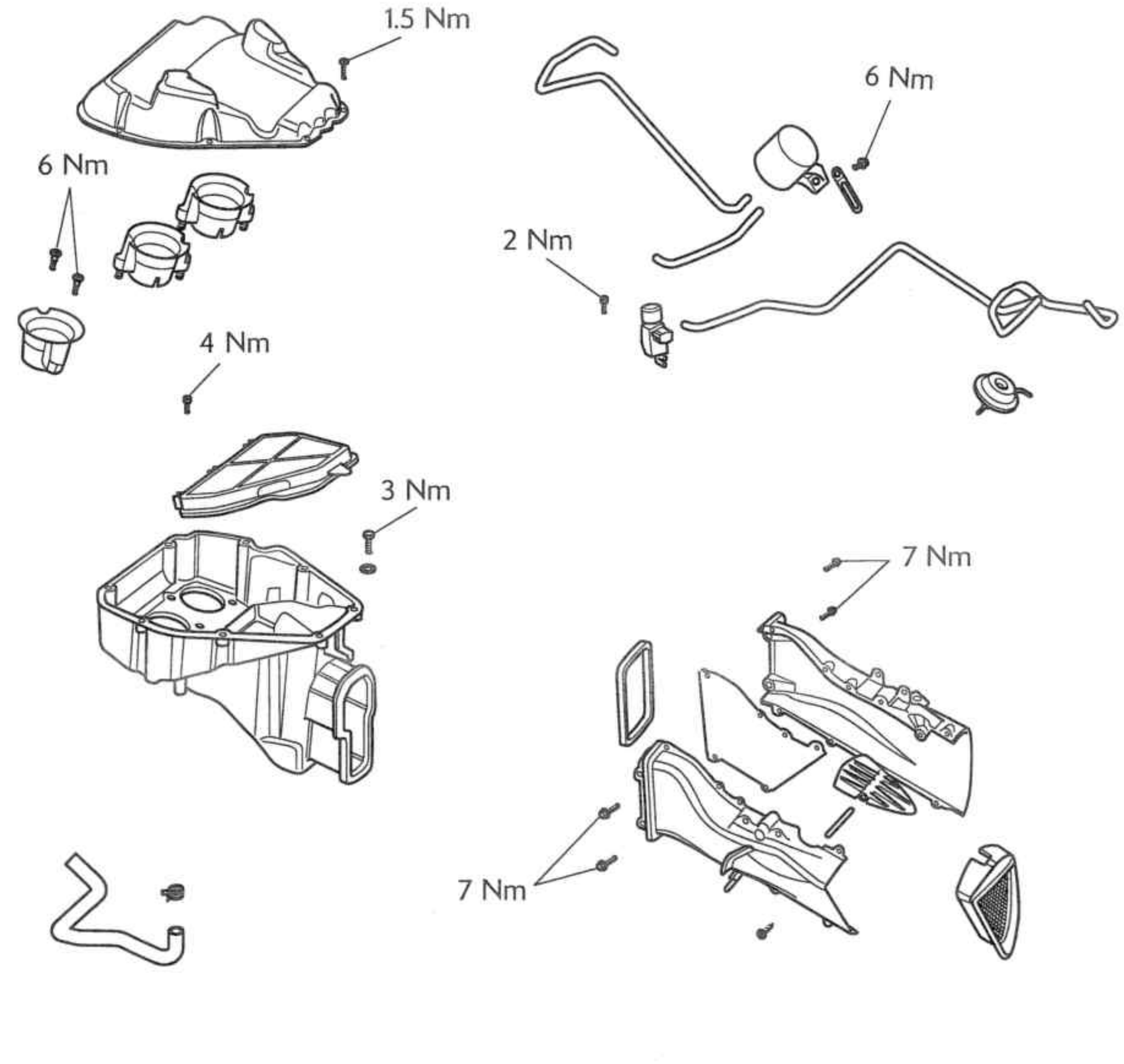
Exploded View - Fuel Tank and Fuel Pump



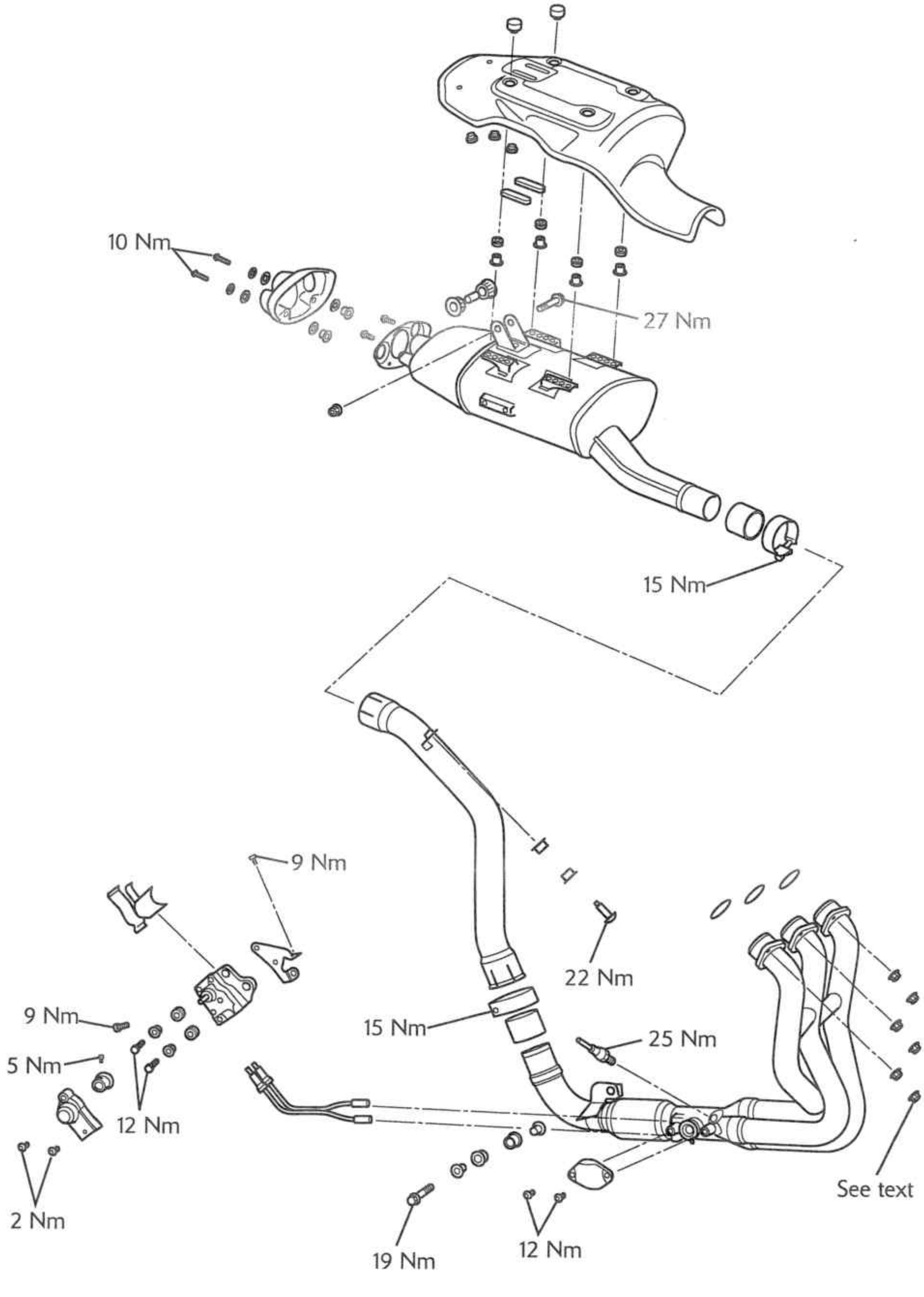
Exploded View - Fuel Rail, Throttles and Injectors



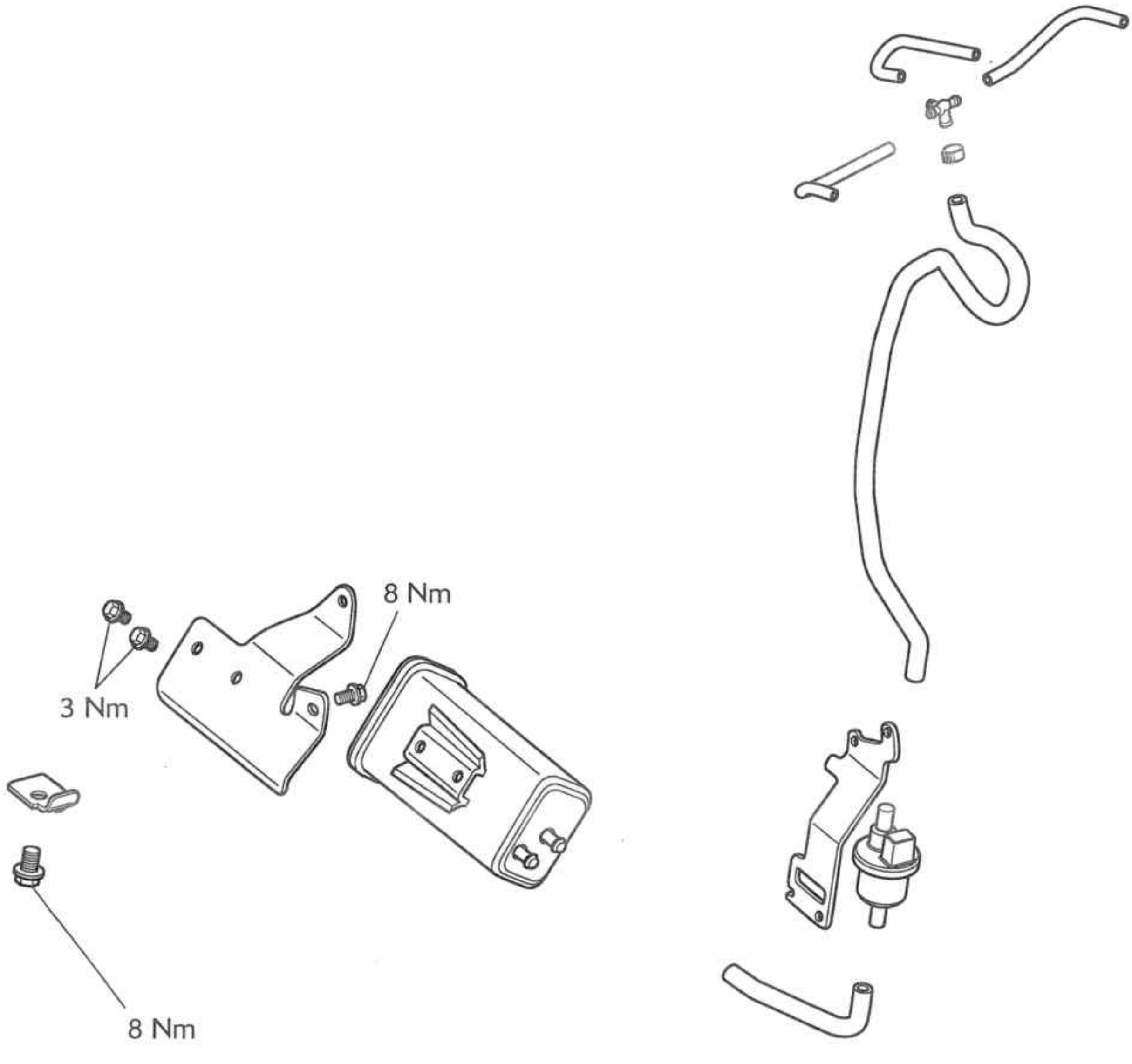
Exploded View - Airbox



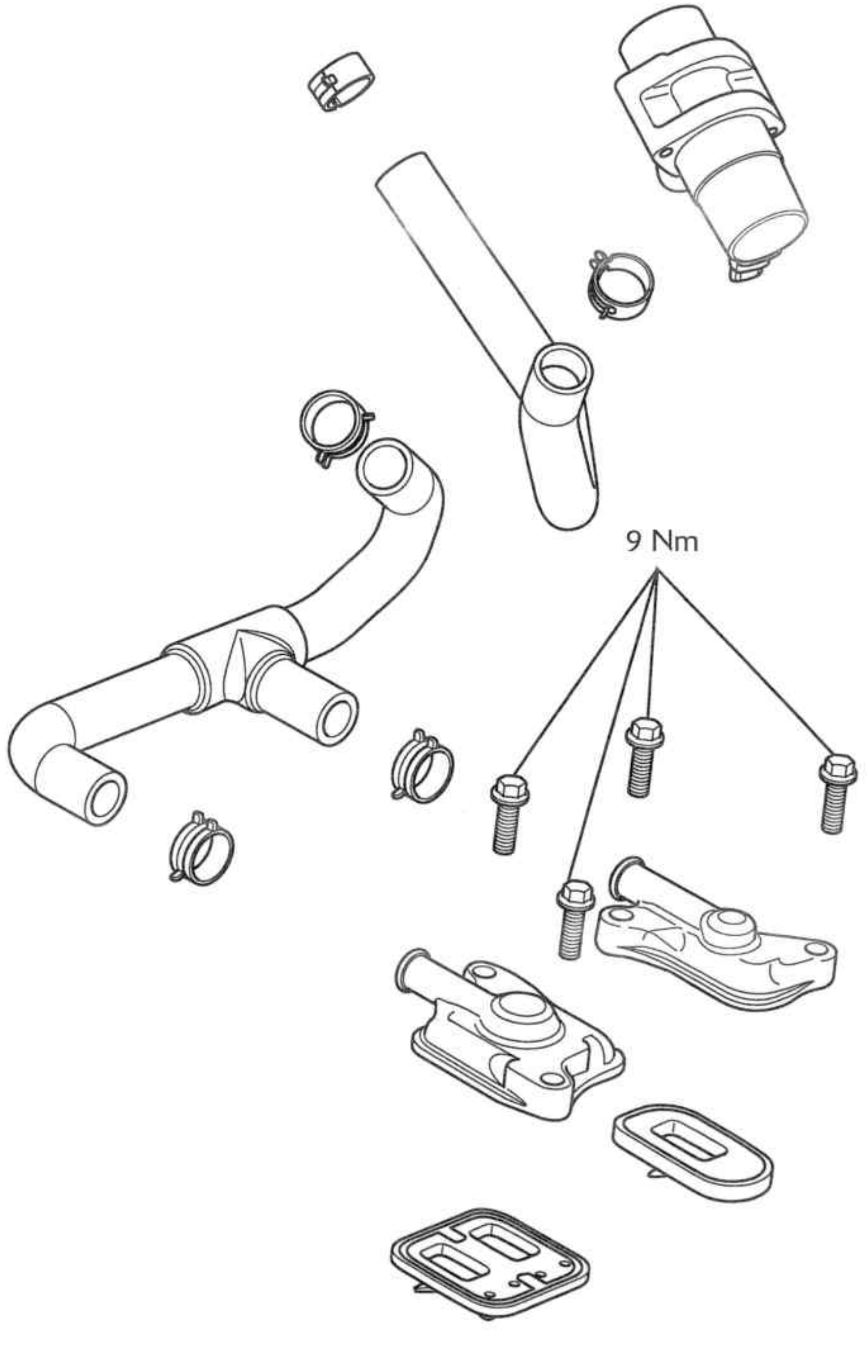
Exploded View - Exhaust System



Exploded View - Evaporative System



Exploded View - Secondary Air Injection



Fuel Requirements

Fuel Requirements - all countries except USA

Outside of America, this model must be run on 95 RON unleaded fuel.

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 89 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.

EXBV

Exhaust Butterfly Valve

Fall detection

The fall detection switch will detect if the motorcycle is on its side and will cut power to the ECM immediately.

Freeze frame

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

Gear position sensor

Gearbox mounted sensor which delivers information to the ECM. This is converted to the gear position value that is displayed on the instrument's gear position indicator and/or neutral lamp.

Idle fuel trim

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

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 the ignition at the spark plug relative to top dead centre (TDC).

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).

Lambda O_2 Sensor

The Lambda 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.

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). Measured after the throttle valves. This reading is compared to the pressure reading in the air box to allow the ECM to calculate engine load.

MIL

Malfunction Indicator Lamp.

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

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.

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 clod.

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.

Secondary air injection

The secondary air injection system helps reduce levels of pollutants in the exhaust gases. It does this by introducing a small amount of air into each exhaust port which promotes further combustion of the fuel mixture in the exhaust system after it has left the combustion chamber.

Sensor supply 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.

TDC

Top Dead Centre.

Vbatt

Battery voltage.

Engine Management System

System Description

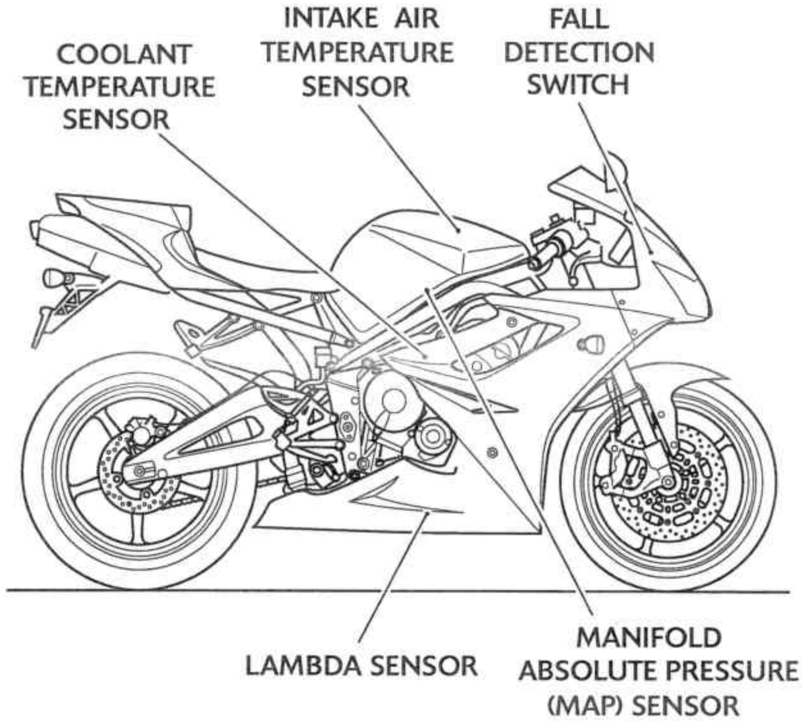
The Daytona 675 is fitted with an electronic engine management system which encompasses control of both ignition and fuel delivery. The electronic control module (ECM) draws information from sensors positioned around the engine, cooling and air intake systems and precisely calculates ignition advance and fueling requirements for all engine speeds and loads.

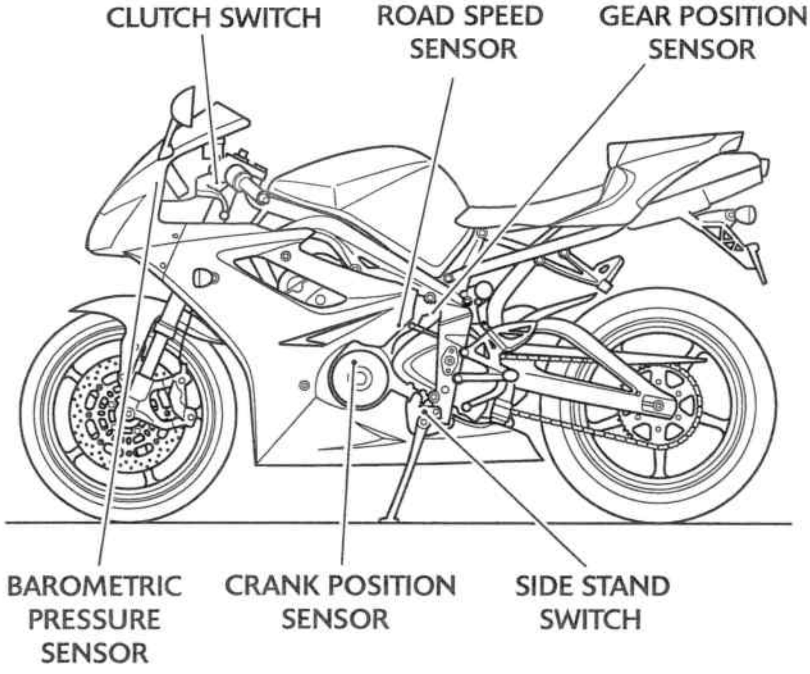
In addition, the system has an on-board diagnostic function. This ensures that, should a malfunction occur in the engine management system, the malfunction type, and engine data at the time the malfunction occurred, are stored in the ECM memory. This stored data can then be recovered using a special 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 behind the cockpit and below the instrument pack. The barometric pressure sensor measures atmospheric air pressure. With this information, the amount of fuel injected is adjusted to suit the prevailing conditions.
- **Manifold Absolute Pressure (MAP) sensor** - situated to the left side of the airbox, connected to each of the three throttle bodies 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 alternator cover. The crankshaft position sensor detects movement of teeth attached to the alternator rotor.
  The toothed rotor 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 coolant temperature sensor** - situated at the rear of the cylinder head. Coolant 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 right 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.
- **Road speed sensor** - situated in the upper crankcase, in front of the engine breather. The road speed sensor provides the ECM with data from which road speed is calculated and displayed on the speedometer.
- **Lambda sensor** - situated in the exhaust header system upstream of the catalyst. The lambda sensor constantly feeds information to the ECM on the content of the exhaust gases. Based on this information, adjustments to the air/fuel ratio are made.
- **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.
- **Gear position sensor** - situated in the upper crankcase, behind the gearbox output sprocket cover, on the left hand side of the engine. The gear position sensor provides the ECM with selected gear information. This is used to prevent the engine from starting if the transmission is in gear. The sensor also provides information to the gear position indicator and the neutral lamp in the instruments.
- **Fall detection switch** - situated below the instrument pack. 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.

Sensor Locations





System Actuators

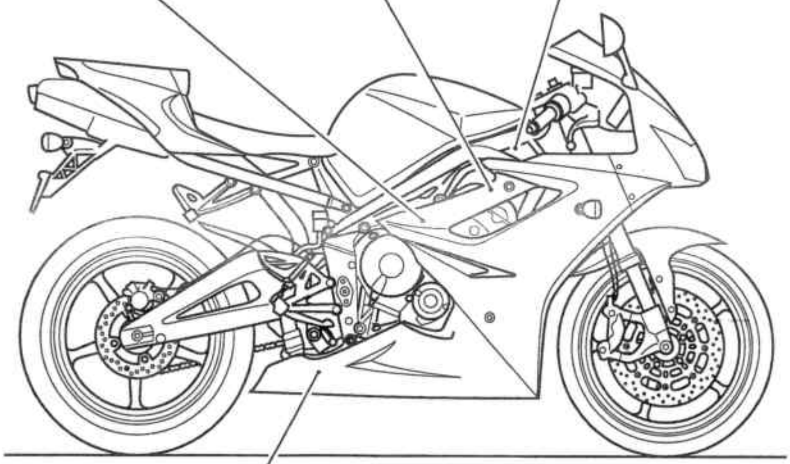
In response to signals received from the sensors, the ECM controls and directs messages to a series of electronic and electro-mechanical actuators. The function and location of the actuators is given below.

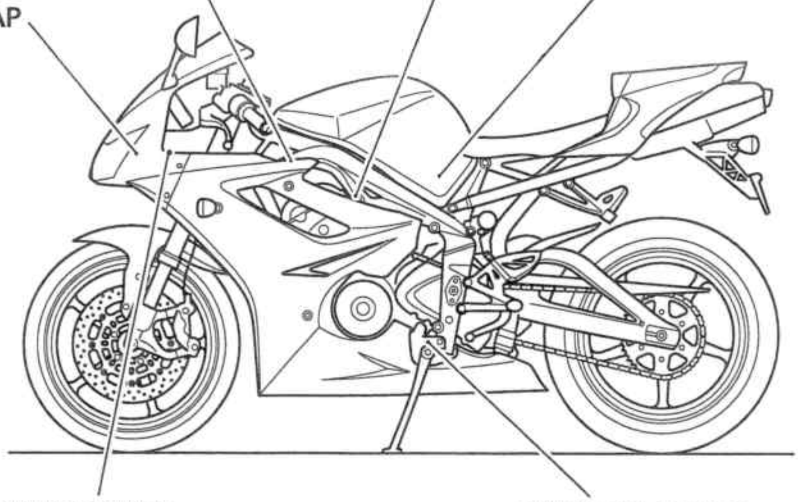
- **Throttle stepper motor** - situated between cylinders two and three of the throttle bodies. The throttle stepper actuates a cam/lever which causes variations in the closed throttle position. Although used primarily to ensure target idle speed is maintained, it also increases throttle opening when the engine is cold.
- **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 on the throttle body. The engine is fitted with three injectors. 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** - plug-top coils are located in the cam cover. There are three 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.
- **EMS main relay** - situated forward of the fuse box. When the ignition is switched on, the EMS main relay is powered up to provide a stable voltage supply for the ECM. When the ignition is turned off, the ECM carries out a power down sequence during which the EMS main relay remains powered by the ECM for 1 minute. The ECM power down sequence includes: writing the adaption data to ECM memory and referencing the position of the throttle stepper motor.
- **Fuel pump** - located inside the fuel tank. The electric pump delivers fuel into the fuel system, via a pressure regulator, at a constant 3 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 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.
- **Cooling fan** - located behind the radiator. The ECM controls switching on and off of the cooling fan in response to a signal received from the coolant temperature sensor. When the coolant temperature rises to a level where the cooling effect of natural airflow is insufficient, the cooling fan is turned on by the ECM. When the coolant temperature falls sufficiently, the ECM turns the cooling fan off. The fan only becomes operational when the engine is running. It will not operate at any other time.
- **Secondary air injection solenoid** - located forward of the airbox, on the left hand side of the air intake. The secondary air injection solenoid controls airflow through the secondary air injection system.
- **Intake air flap** - located in the air intake, between the headlamps. The purpose of the intake air flap is to improve low down power delivery. The intake air flap is closed up to 4500 rpm and 12 degrees of throttle, above which it opens.
- **Exhaust butterfly valve** - located in the exhaust headers downstream of the Lambda sensor. The purpose of the exhaust valve is to improve low down power delivery. At idle, the exhaust valve is 30% open, rising to approximately 50% open at 4500 rpm, and fully open at 7000 rpm and above. The profile that the exhaust valve follows has been designed to give no reduction of torque at full throttle.

Note:

- **In this system, the starter lockout system (clutch switch, gear position sensor, sidestand switch) all operate through the engine management ECM.**

Actuator Locations





Engine Management Circuit Diagram - Daytona 675

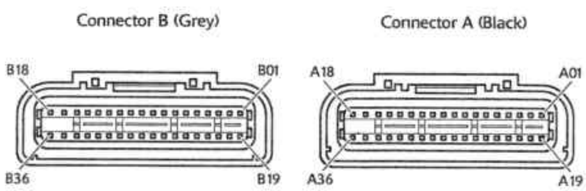
Key To Wiring Circuit Diagram

Key	Item Description
1	Engine Control Module
2	Diagnostic Connector
3	Instrument Assembly
4	Vehicle Speed Sensor
5	Clutch Switch
6	Starter Relay
7	Sidestand Switch
8	Gear Position Sensor
9	Lambda Sensor
10	Barometric Pressure Sensor
11	Intake Air Temperature Sensor
12	MAP Sensor
13	Coolant Temperature Sensor
14	Fall Detection Switch
15	Throttle Position Sensor
16	Exhaust Butterfly Valve Actuator
17	Low Fuel Sensor
18	Idle Speed Control Stepper Motor
19	Cooling Fan
20	Cooling Fan Relay
21	Fuse Box (fuse 5)
22	Intake Air Flap Solenoid
23	Ignition Coils
24	Secondary Air Injection Solenoid
25	Engine Stop Switch
26	Fuel Pump
27	Heated Lambda Sensor
28	Purge Valve
29	Fuel Injectors
30	Crankshaft Position Sensor
31	Engine Management System (EMS) Main Relay

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

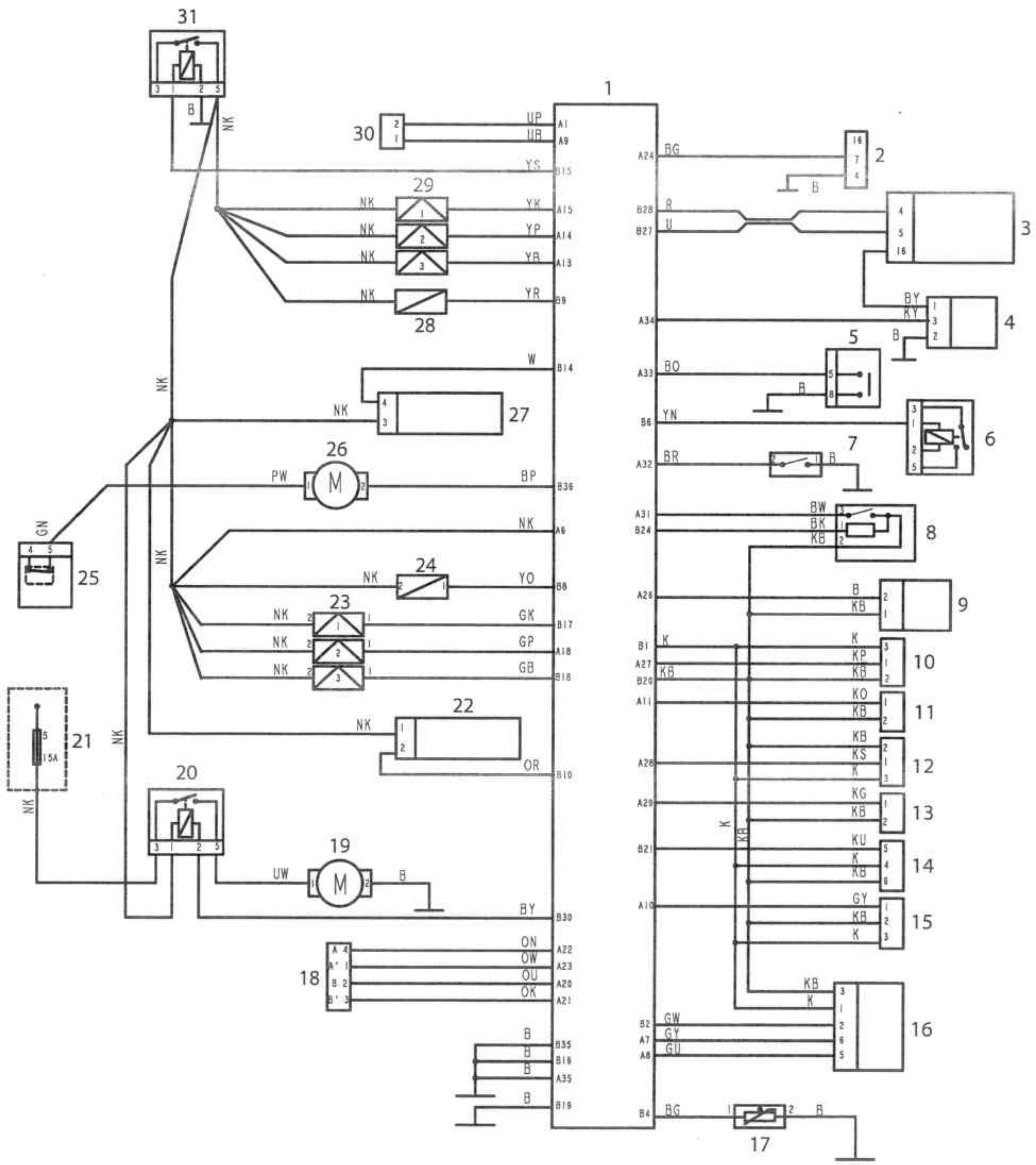
ECM Connector Pin Numbering



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 from 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.

Circuit Diagram - Engine Management System - Daytona 675



System Diagnostics

The engine management system has an on-board diagnostics feature which allows service technicians to retrieve stored data from the ECM using the Triumph diagnostic tool. Full details of the tool's operation and how to interpret the results are given elsewhere in this section.

The tool is connected to the motorcycle using a dedicated diagnostic plug situated beneath the seats. 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 coolant temperature must be raised to 72° C or more.
- The coolant 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.**

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 tool.

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

Full details of how to operate the tool and how to interpret the data follow later in this section.

Current Data

By using the Triumph diagnostic tool, live engine data (engine running) can be recovered from the motorcycle. The data available is:

Function Examined	Result Reported (Scale)
Engine speed	RPM
Calculated load	%
Coolant temperature	°C
Short term fuel trim	%
Throttle Position	%
Intake air temperature	°C
Vehicle speed	km/h
Ignition Advance	degrees
Heated oxygen sensor output voltage	Volts
Intake manifold absolute pressure	mm/hg
Fuel system status	open or closed loop operation

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)
Engine speed	RPM
Calculated load	%
Coolant temperature	°C
Short term fuel trim	%
Throttle Position	%
Intake air temperature	°C
Vehicle speed	km/h
Ignition Advance	degrees
Heated oxygen sensor output voltage	Volts
Intake manifold absolute pressure	mm/hg
Fuel system status	open or closed loop operation

Function Tests

The system allows the diagnostic tool 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	Visual inspection of instruments
Idle speed control stepper motor	Stored fault code*/Stepper motor operation
Purge control valve	Stored fault code*/Valve operation
Fuel pump operation	Stored fault code*/Fuel pressure test
Cooling fan	Stored fault code*/Fan operation
Secondary air injection solenoid	Stored fault code*/ Solenoid operation
Air intake flap	Stored fault code*/ Solenoid operation
Exhaust butterfly valve	Stored fault code*/Visual inspection of cable operation
Exhaust butterfly valve cable adjust or replace	Adjust or replace exhaust valve cables/Stored fault code*

* If a fault is detected.

Checks/Adjustments

Adjustments

Using the Triumph diagnostic tool, it is possible to reset the ECU to the factory default settings, balance the throttle bodies and replace or adjust the exhaust butterfly valve cables.

Further facilities are provided to allow correct replacement/adjustment of the primary throttle position sensor and the primary throttle stepper motor. These facilities are needed as, after replacement of the parts concerned, adjustments have to be made to specific voltage settings, all with the throttles in a specific position.

Full details of these procedures are provided later in this section.

Adaption status

Because the fuel system is adaptive, the tool is able to automatically adjust to new working conditions. This screen displays information as to the adaption status of the vehicle, which will show if it has adapted or not.

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)	%

Build data

The following items of build data can also be read.

Function Examined
Vehicle Identification Number (VIN)
Triumph ECM part number
ECM manufacturer's part number
ECM serial number
Software version number (tune number)

Checks

When using this function it is possible to check the status of various sensors and actuators and also check certain items of factory data logged during vehicle assembly.

The data sets are divided into three groups, voltages/ pressures, throttles/coils/injectors and other data

The data available under voltages is:

Item Checked	Result Unit
Throttle position sensor voltage	Volts
Manifold absolute pressure sensor voltage	Volts
Manifold absolute pressure (one reading per cylinder)	mmHg
Atmospheric pressure sensor voltage	Volts
Atmospheric pressure	mmHg
Battery voltage	Volts
Coolant temperature	°C
Coolant temperature sensor voltage	Volts
Air temperature	°C
Air temperature sensor voltage	Volts
Oxygen sensor output voltage	Volts
Fuel level sensor voltage	Volts
Low fuel light	on/off
Exhaust butterfly valve sensor voltage	Volts
Exhaust butterfly valve sensor voltage	%
Voltage from ignition switch to ECU	Volts

The data available under throttles/coils/injectors is:

Item Checked	Result Unit
Idle reference speed	RPM
Engine speed	RPM
Injector 1 pulse time	milliseconds
Injector 2 pulse time	milliseconds
Injector 3 pulse time	milliseconds
Ignition timing cyl 1	degrees BTDC
Ignition timing cyl 2	degrees BTDC
Ignition timing cyl 3	degrees BTDC
Coil 1 dwell time	milliseconds
Coil 2 dwell time	milliseconds
Coil 3 dwell time	milliseconds
Throttle position	% open
Secondary air injection status	SAI on/off
Idle speed control current steps	numeric
Idle speed control target steps	numeric

The data available under 'other' is:

Item Checked	Result Unit
Malfunction indicator light status	MIL on/off
Fan relay status	on/off
Starter relay status	starter on/off
Fall detection status	normal/over
Oxygen sensor heater status	heater on/off
Cooling fan status	fan on/off
Vehicle speed	km/h
Short term fuel trim	±100%
Calculated load	%
Purge valve duty cycle	%
Gear position	numeric value
Neutral switch	gear/neutral
Starter switch status	switch on/off
EMS Main relay status	relay on/off
Side stand status	up/down
Clutch switch status	release/grip
Air flap solenoid status	off/on

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

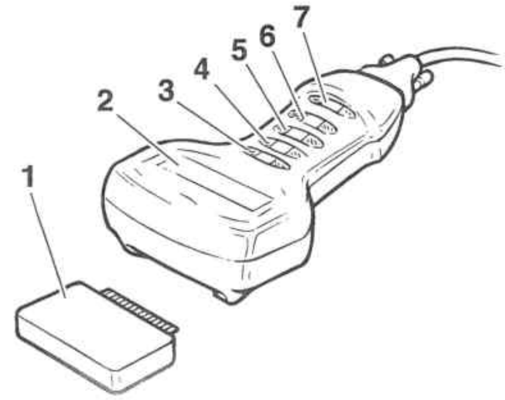
The system will log the diagnostic trouble codes listed below/over:

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
P0203	Injector 3 circuit malfunction	3	40	Yes
P1201	Injector 1 open circuit/short to ground	3	40	Yes
P1202	Injector 2 open circuit/short to ground	3	40	Yes
P1203	Injector 3 open circuit/short to ground	3	40	Yes
P0351	Ignition coil 1 circuit malfunction	3	40	Yes
P0352	Ignition coil 2 circuit malfunction	3	40	Yes
P0353	Ignition coil 3 circuit malfunction	3	40	Yes
P0335	Crankshaft sensor circuit malfunction	3	40	Yes
P0032	Oxygen sensor heater short circuit to battery	3	40	Yes
P0031	Oxygen sensor heater open circuit/short to ground	3	40	Yes
P0030	Oxygen sensor heater circuit malfunction	3	40	Yes
P0136	Oxygen sensor circuit malfunction	3	40	Yes
P0122	Throttle position sensor low input	3	40	Yes
P0123	Throttle position sensor high input	3	40	Yes
P0107	Manifold absolute pressure sensor low voltage	3	40	Yes
P0108	Manifold absolute pressure sensor high voltage	3	40	Yes
P1105	Manifold absolute pressure sensor pipe malfunction	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 temperature too high	3	40	Yes
P0118	Engine coolant temperature too low	3	40	Yes
P0500	Vehicle speed sensor malfunction	3	40	Yes

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
P1552	Cooling fan short circuit/open circuit	3	40	Yes
P1553	Cooling fan short to battery voltage/over temperature	3	40	Yes
P1628	Fuel pump short circuit to ground or open circuit	3	40	Yes
P1629	Fuel pump 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
P0617	Starter relay short circuit to battery	3	40	Yes
P0616	Starter relay short circuit to ground or open circuit	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
P0505	Idle speed control system malfunction	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
P1500	Vehicle speed output circuit malfunction*	0	40	No
P0654	Tachometer circuit malfunction*	0	40	No
P1115	Coolant temperature gauge circuit malfunction*	0	40	No
P0460	Fuel level sensor circuit malfunction*	0	40	No
P0705	Gear position sensor circuit malfunction*	0	40	No
P1610	Low fuel output circuit malfunction*	0	40	No
P0630	EEPROM fault*	0	40	No
P1690	CAN communication fault	N/A	40	No
P1078	Exhaust control valve actuator position sensor circuit low voltage (short to ground)	3	40	Yes
P1079	Exhaust control valve actuator position sensor circuit high voltage (short to Vcc)	3	40	Yes
P0078	Exhaust control valve actuator circuit malfunction	3	40	Yes
P1080	Exhaust control valve actuator mechanism malfunction	3	40	Yes
P1671	Intake flap solenoid circuit short to Vbatt	3	40	Yes
P1670	Intake flap solenoid circuit short to ground or open circuit	3	40	Yes
P1685	EMS main relay circuit malfunction	3	40	Yes
P1659	EMS ignition voltage input malfunction	3	40	Yes
*-Supported by DTC P1690				

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
P1698	Sensor supply (Vcc) circuit malfunction	3	40	Yes
P1602	Tunelock	Only if Tunelock is unlocked		Flashing
P1614	ECM or tune ID Incorrect	Only if Instrument ID Matching		Flashing

Service Diagnostic Tool



1. **Memory card**
2. **Screen**
3. **Return key**
4. **Up key**
5. **Down key**
6. **Validate key**
7. **Help key**

The memory card (1) contains all the information necessary to allow the technician to follow a number of different paths to:

- Diagnose faults
- Obtain data
- Make checks / adjustments

It is removable to allow replacement / update cards to be inserted.

The screen comprises four horizontal lines and twenty vertical columns forming a series of boxes into which letters and numbers can be displayed to provide the necessary question, message, answer etc.

At the left of the screen, one or more symbols as detailed below may be displayed.

									D	I	A	G	N	O	S	T	I	C	S
				C	U	R	R	E	N	T		D	A	T	A				
▶				R	E	A	D		S	T	O	R	E	D		D	T	C	S
▼				F	U	N	C	T	I	O	N		T	E	S	T	S		

Typical screen showing symbol examples

▲▼ Cursors to indicate that further lines of text are available to be seen above and/or below those already in view, by scrolling the text up or down using the 'Up' or 'Down' keys.

▶ Cursor to show which line of text is 'active'.

? Indicates further help/guidance information available on that line by pressing the help key.

Tool Keys

In most cases, the Return key (↵) enables the user to return to the screen last displayed.

Return key

The Up and Down keys - press to move the lines of text up or down. They are also used to enter the dealer number and the date.

Up/down keys (2 separate keys)

Press the Validation key (✻) to move on to the next message.

Validation key

The Help key can be used when the '?' symbol shows, to get more information about that line of text. To return to the diagnostic screen from the help area, press the help '?' button again.

Help key

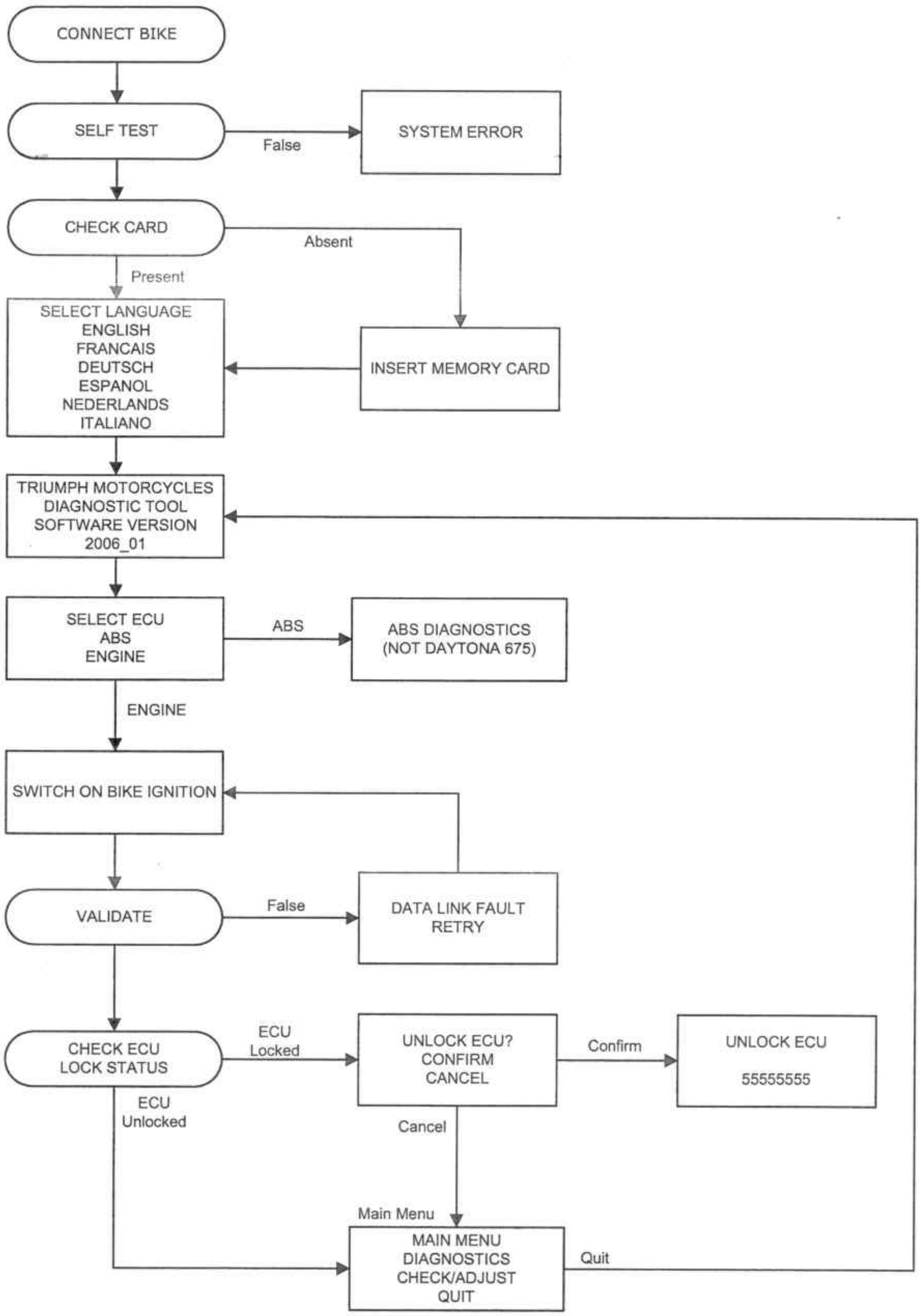
Test Procedure

The following describes the procedure to follow when using the service diagnostic tool. It does not cover the further diagnosis that must be carried out once a fault area has been identified. For details of the procedure to follow when a fault area or fault code has been identified, refer to the diagnosis details later in this section.

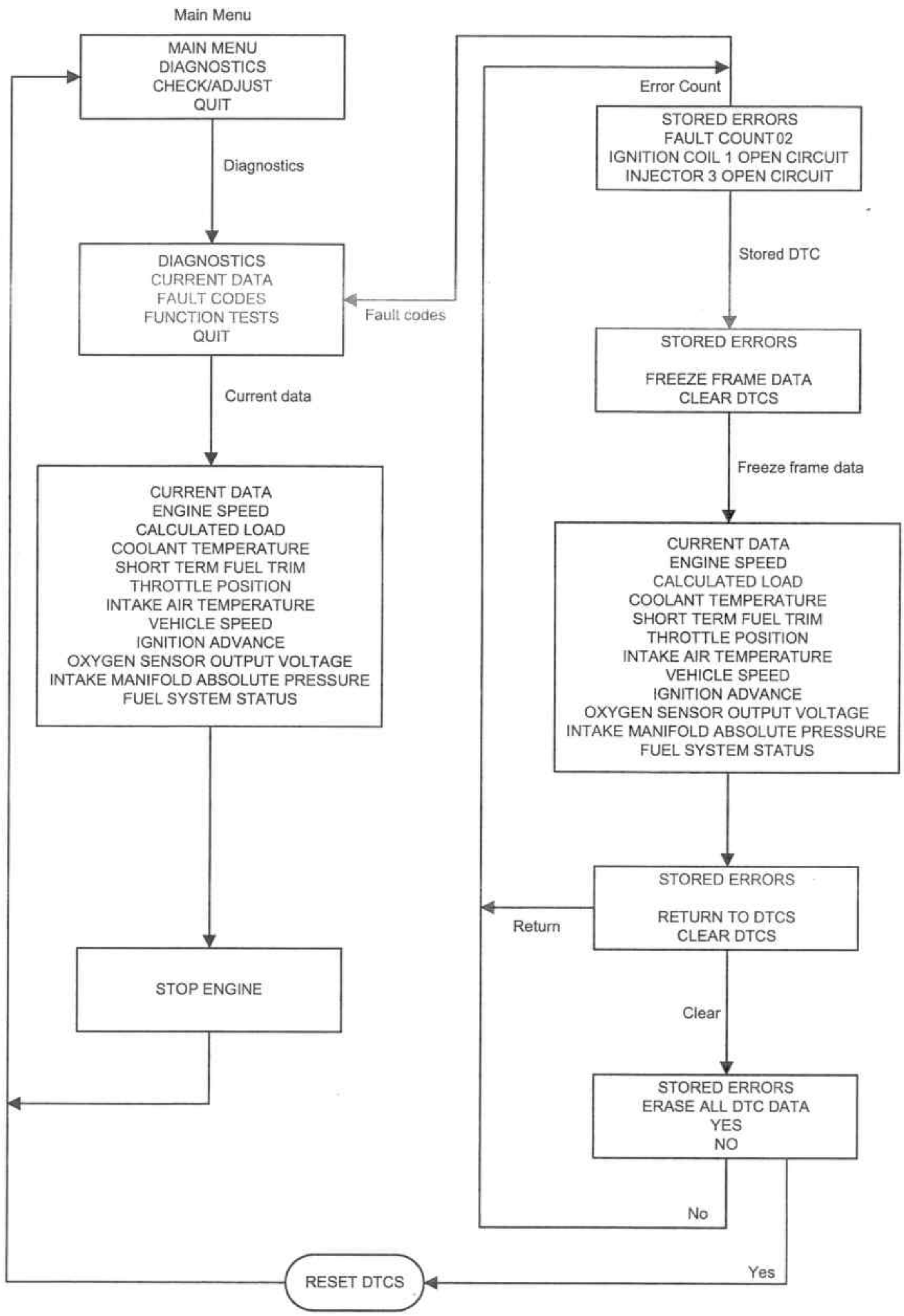
Note:

- **The tool does not retain any memory of faults, diagnosis etc. carried out on any particular motorcycle. Any such memory is only retained in the motorcycle's ECM.**
- **The following seven pages describe the tool operations in flow chart form.**

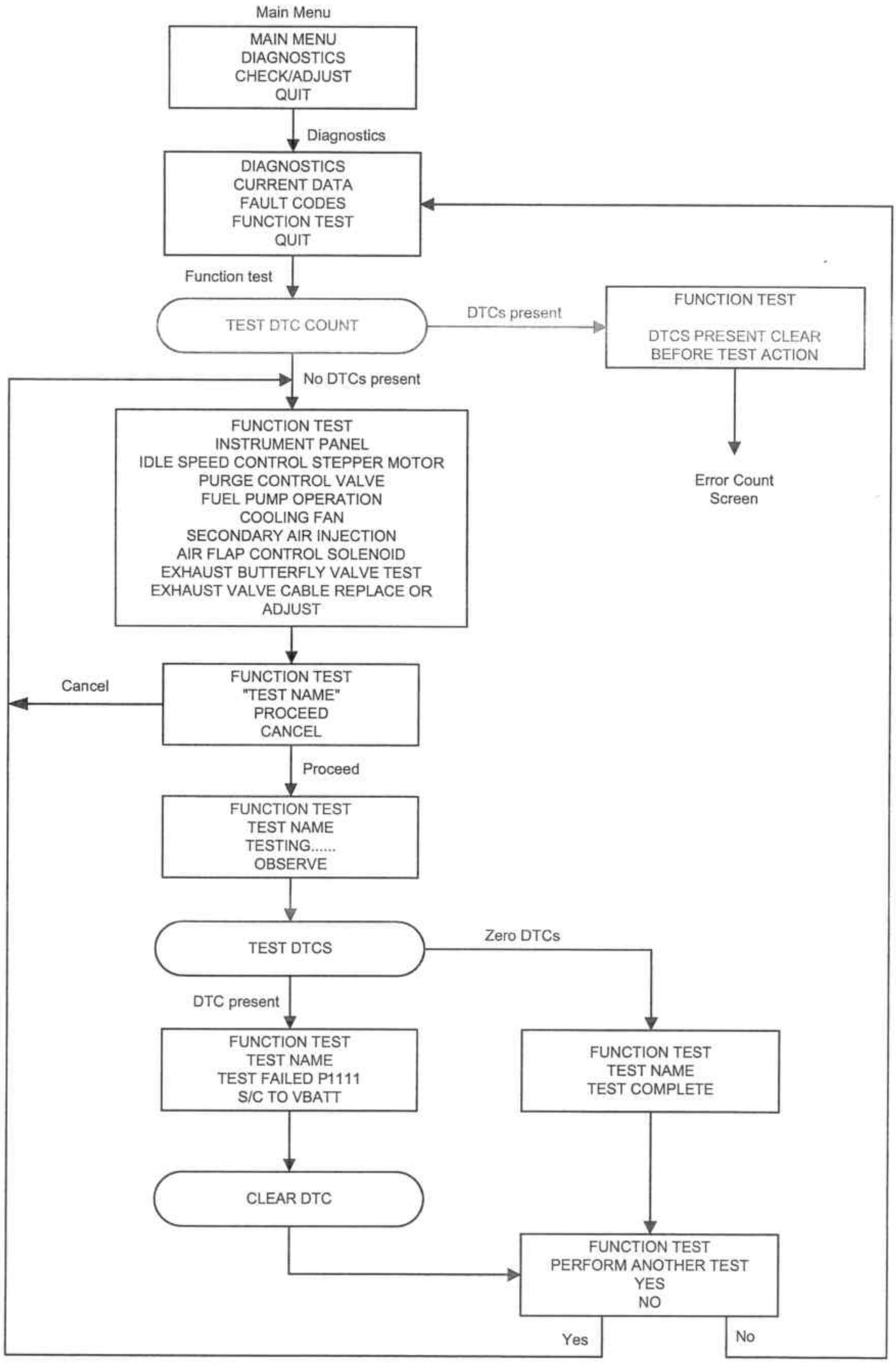
Initialisation



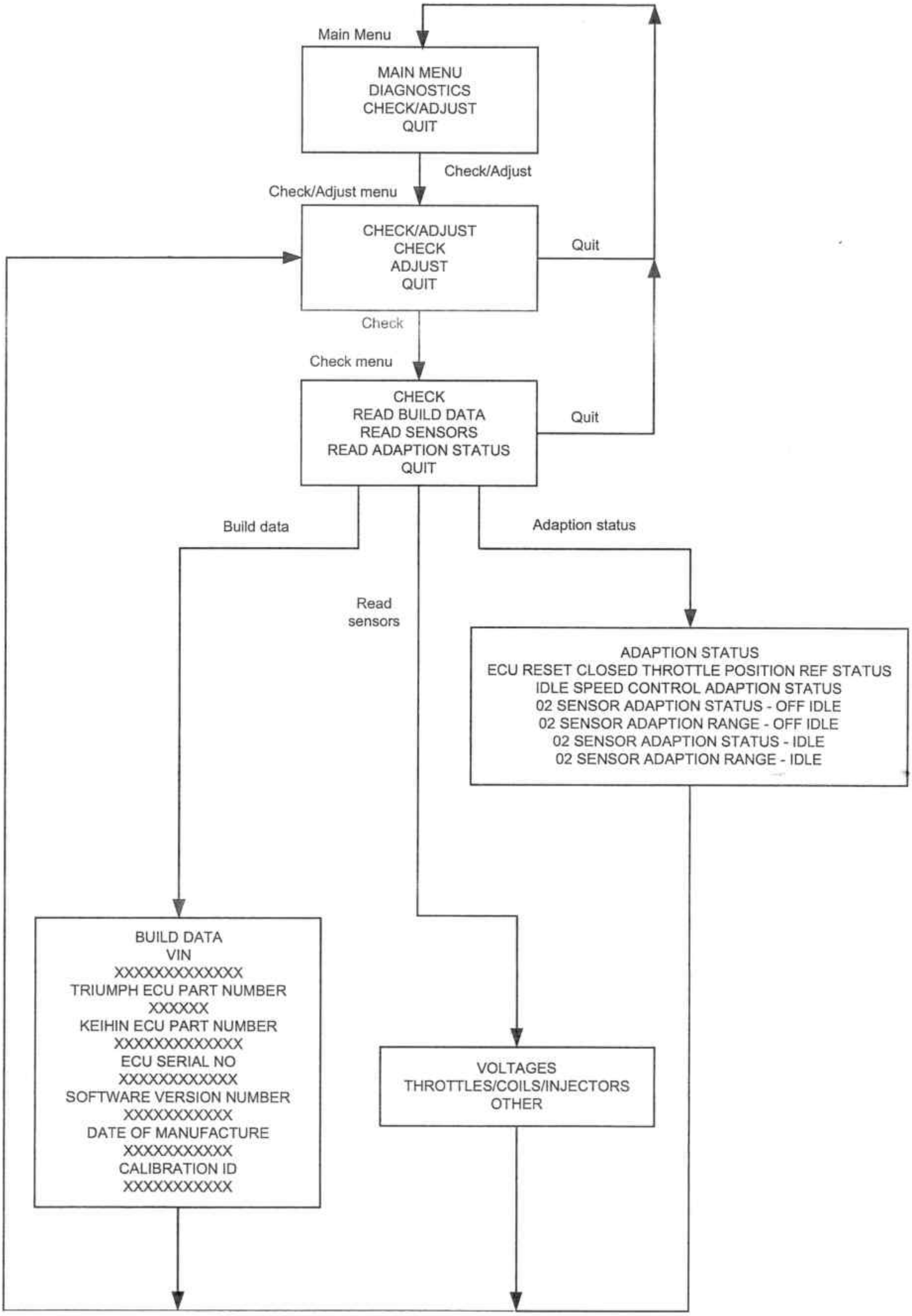
Diagnostics



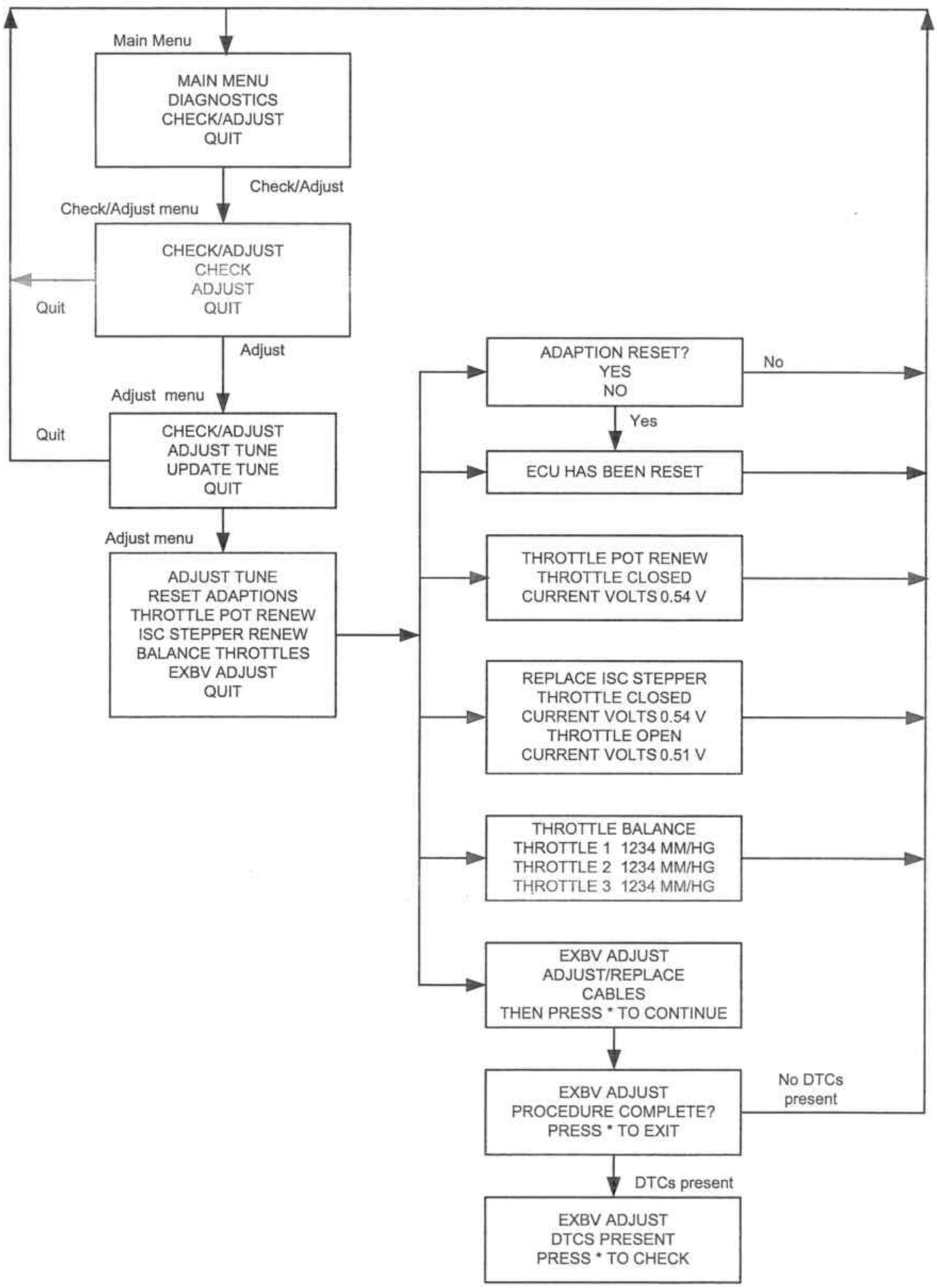
Function Tests



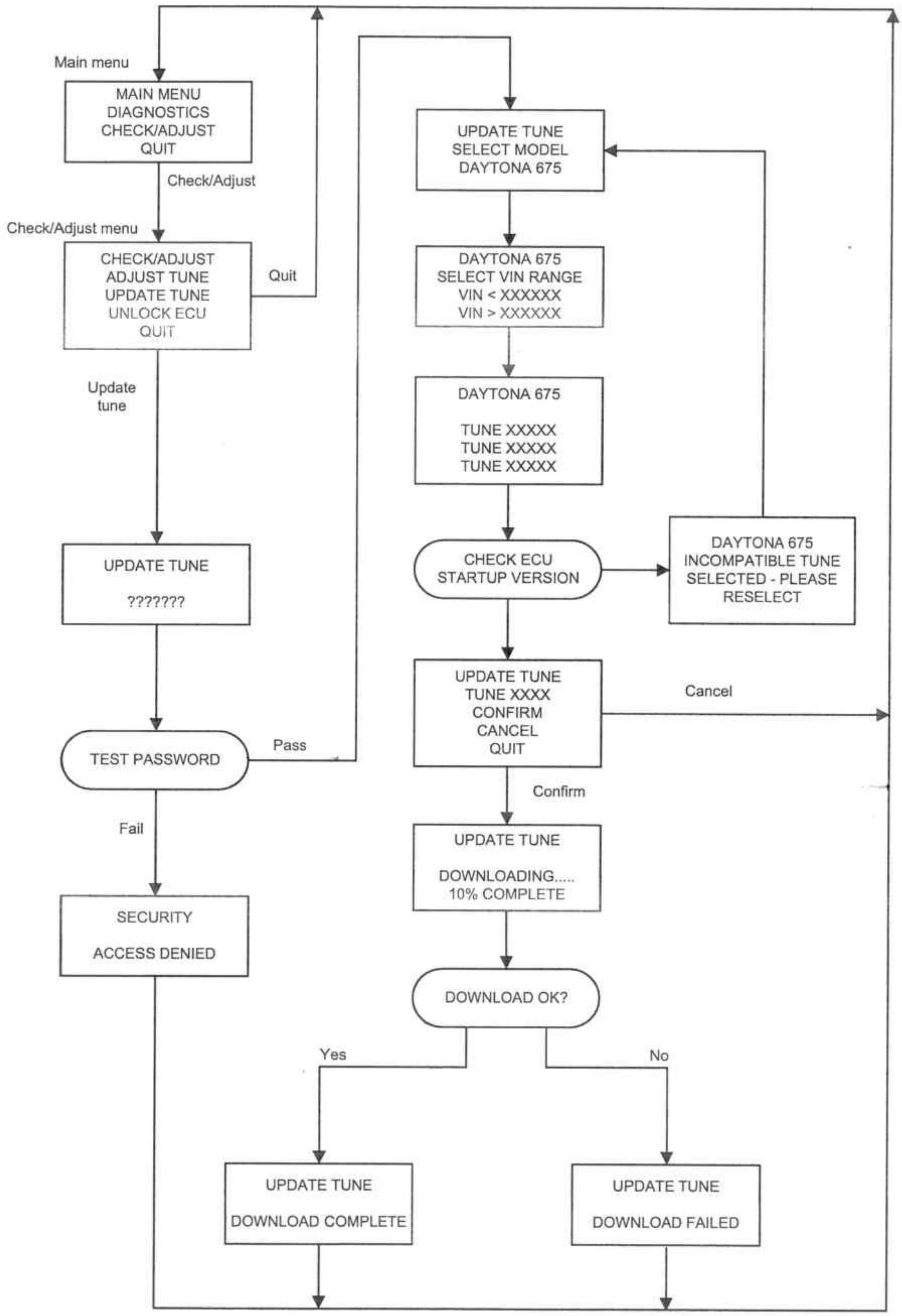
Checks


Main Menu
MAIN MENU
DIAGNOSTICS
CHECK/ADJUST
QUIT
Check/Adjust
Check/Adjust menu
CHECK/ADJUST
CHECK
ADJUST
QUIT
Quit
Check
Check menu
CHECK
READ BUILD DATA
READ SENSORS
READ ADAPTION STATUS
QUIT
Quit
Build data
Adaption status
Read sensors
ADAPTION STATUS
ECU RESET CLOSED THROTTLE POSITION REF STATUS
IDLE SPEED CONTROL ADAPTION STATUS
02 SENSOR ADAPTION STATUS - OFF IDLE
02 SENSOR ADAPTION RANGE - OFF IDLE
02 SENSOR ADAPTION STATUS - IDLE
02 SENSOR ADAPTION RANGE - IDLE
BUILD DATA
VIN
XXXXXXXXXXXXX
TRIUMPH ECU PART NUMBER
XXXXXX
KEIHIN ECU PART NUMBER
XXXXXXXXXXXXX
ECU SERIAL NO
XXXXXXXXXXXX
SOFTWARE VERSION NUMBER
XXXXXXXXXXX
DATE OF MANUFACTURE
XXXXXXXXXXX
CALIBRATION ID
XXXXXXXXXXX
VOLTAGES
THROTTLES/COILS/INJECTORS
OTHER

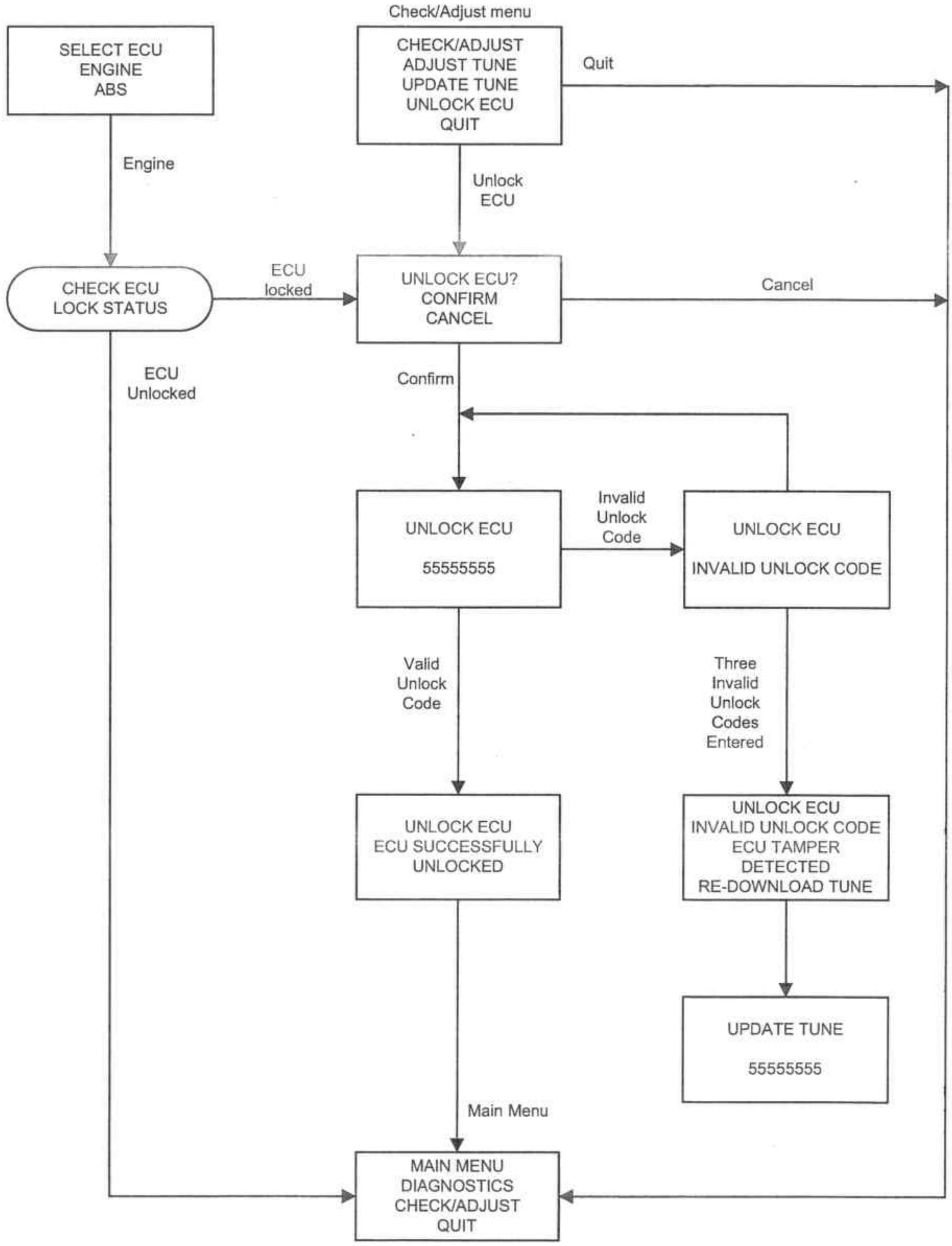
Adjust Tune


Main Menu
MAIN MENU
DIAGNOSTICS
CHECK/ADJUST
QUIT
Check/Adjust
Check/Adjust menu
CHECK/ADJUST
CHECK
ADJUST
QUIT
Quit
Adjust
Adjust menu
Quit
CHECK/ADJUST
ADJUST TUNE
UPDATE TUNE
QUIT
Adjust menu
ADJUST TUNE
RESET ADAPTIONS
THROTTLE POT RENEW
ISC STEPPER RENEW
BALANCE THROTTLES
EXBV ADJUST
QUIT
ADAPTION RESET?
YES
NO
No
Yes
ECU HAS BEEN RESET
THROTTLE POT RENEW
THROTTLE CLOSED
CURRENT VOLTS 0.54 V
REPLACE ISC STEPPER
THROTTLE CLOSED
CURRENT VOLTS 0.54 V
THROTTLE OPEN
CURRENT VOLTS 0.51 V
THROTTLE BALANCE
THROTTLE 1 1234 MM/HG
THROTTLE 2 1234 MM/HG
THROTTLE 3 1234 MM/HG
EXBV ADJUST
ADJUST/REPLACE
CABLES
THEN PRESS * TO CONTINUE
EXBV ADJUST
PROCEDURE COMPLETE?
PRESS * TO EXIT
No DTCs
present
DTCs present
EXBV ADJUST
DTCS PRESENT
PRESS * TO CHECK

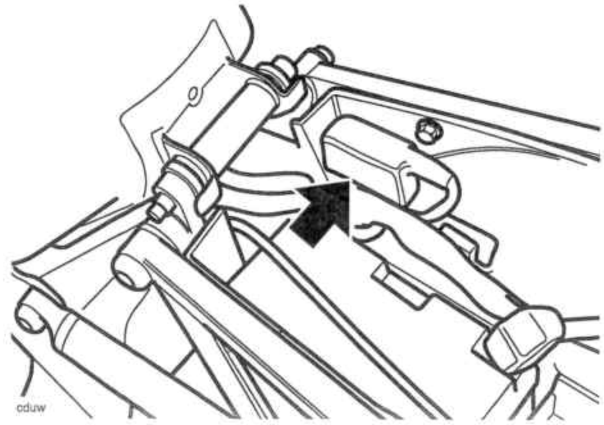
Update Tune


Main menu
MAIN MENU
DIAGNOSTICS
CHECK/ADJUST
QUIT
Check/Adjust
Check/Adjust menu
CHECK/ADJUST
ADJUST TUNE
UPDATE TUNE
UNLOCK ECU
QUIT
Quit
Update tune
UPDATE TUNE
???????
TEST PASSWORD
Pass
Fail
SECURITY
ACCESS DENIED
UPDATE TUNE
SELECT MODEL
DAYTONA 675
DAYTONA 675
SELECT VIN RANGE
VIN < XXXXXX
VIN > XXXXXX
DAYTONA 675
TUNE XXXXX
TUNE XXXXX
TUNE XXXXX
CHECK ECU
STARTUP VERSION
DAYTONA 675
INCOMPATIBLE TUNE
SELECTED - PLEASE
RESELECT
UPDATE TUNE
TUNE XXXX
CONFIRM
CANCEL
QUIT
Cancel
Confirm
UPDATE TUNE
DOWNLOADING.....
10% COMPLETE
DOWNLOAD OK?
Yes
No
UPDATE TUNE
DOWNLOAD COMPLETE
UPDATE TUNE
DOWNLOAD FAILED

Unlock ECU

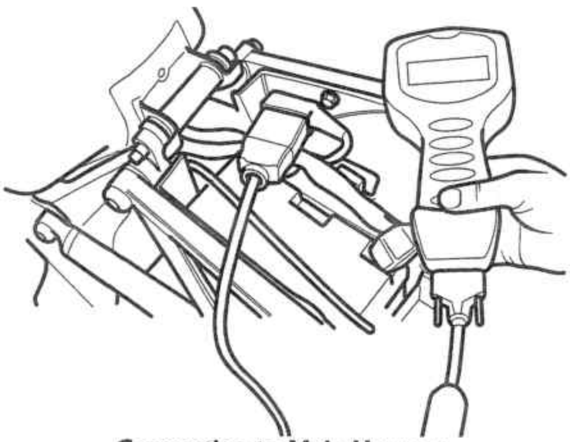

Check/Adjust menu
SELECT ECU
ENGINE
ABS
CHECK/ADJUST
ADJUST TUNE
UPDATE TUNE
UNLOCK ECU
QUIT
Quit
Engine
Unlock
ECU
CHECK ECU
LOCK STATUS
ECU
locked
UNLOCK ECU?
CONFIRM
CANCEL
Cancel
ECU
Unlocked
Confirm
UNLOCK ECU
55555555
Invalid
Unlock
Code
UNLOCK ECU
INVALID UNLOCK CODE
Valid
Unlock
Code
Three
Invalid
Unlock
Codes
Entered
UNLOCK ECU
ECU SUCCESSFULLY
UNLOCKED
UNLOCK ECU
INVALID UNLOCK CODE
ECU TAMPER
DETECTED
RE-DOWNLOAD TUNE
UPDATE TUNE
55555555
Main Menu
MAIN MENU
DIAGNOSTICS
CHECK/ADJUST
QUIT

1. CONNECTION AND POWER-UP



Connection to Main Harness (arrowed)

Connect the tool to the dedicated multi-plug beneath the rider's seat. To remove the rider's seat see page 16-11.



Connection to Main Harness

A message appears on the screen and certain checks are made automatically, e.g. Is the memory card fitted?

'SELECT LANGUAGE' will then be displayed.

2 SELECT LANGUAGE

			S	E	L	E	C	T		L	A	N	G	U	A	G	E		
▶							E	N	G	L	I	S	H						
							F	R	A	N	C	A	I	S					
							D	E	U	T	S	C	H						
							E	S	P	A	N	O	L						
							I	T	A	L	I	A	N	O					
							N	E	D	E	R	L	A	N	D	S			

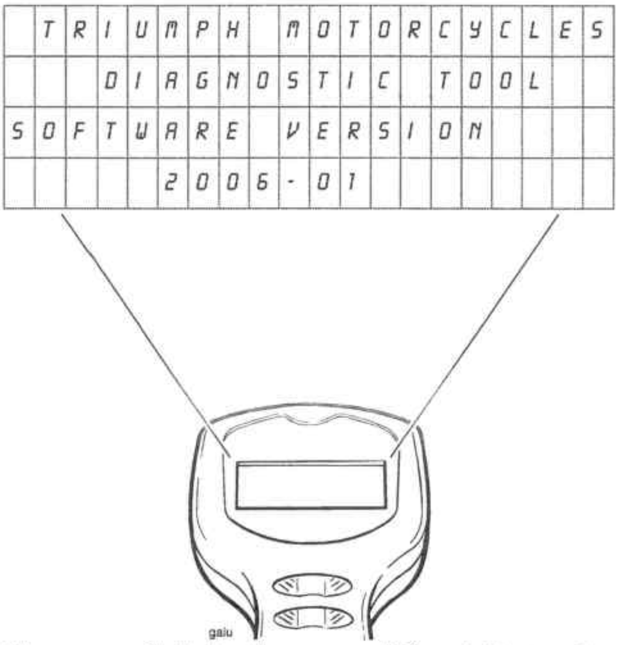
Use the 'Up' and 'Down' keys to move the cursor in column 1 and select the language required.

Note:

- **The tool will always select English as the default language, and it is only necessary to use the cursor to select one of the other languages. The entire diagnostic session will then continue in the chosen language.**

Press the validation key '⁎' to move on.

3 TRIUMPH MOTORCYCLES

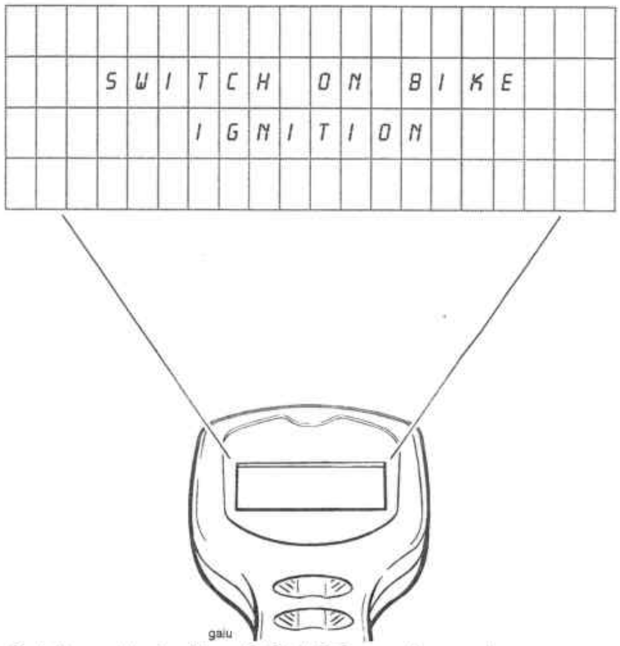


The screen will display the message 'Triumph Motorcycles Diagnostic Tool' and will also give the diagnostic software version and the software release year.

Press the validation key '*' to move on.

If the Return key (↵) is pressed, the tool will return to the 'SELECT LANGUAGE' display.

4 SWITCH ON BIKE IGNITION



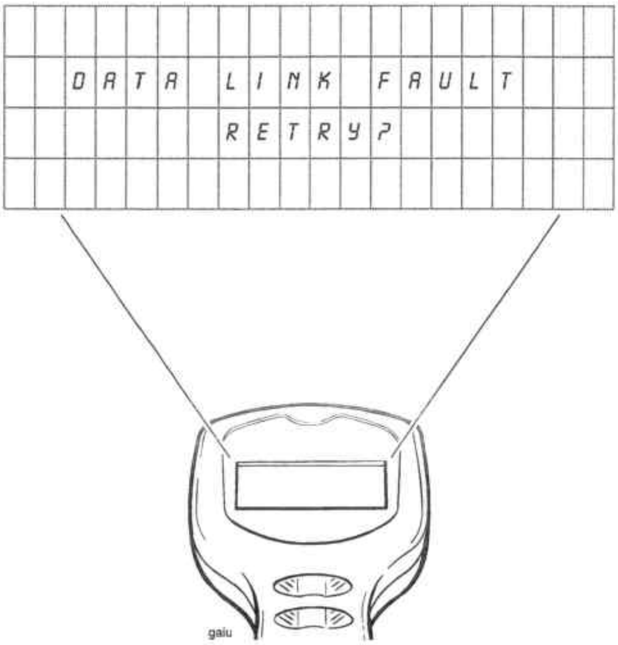
Switch on the ignition. DO NOT start the engine.

Press the validation key '*'. During a short delay period the tool will carry out certain validation checks.

If it detects a problem which will invalidate the test, 'DATA LINK FAULT RETRY?' will be displayed.

If all is OK, 'SERVICE DATA' will appear on the screen.

5 DATA LINK FAULT RETRY?



If the above is displayed, check that the ignition is switched on.

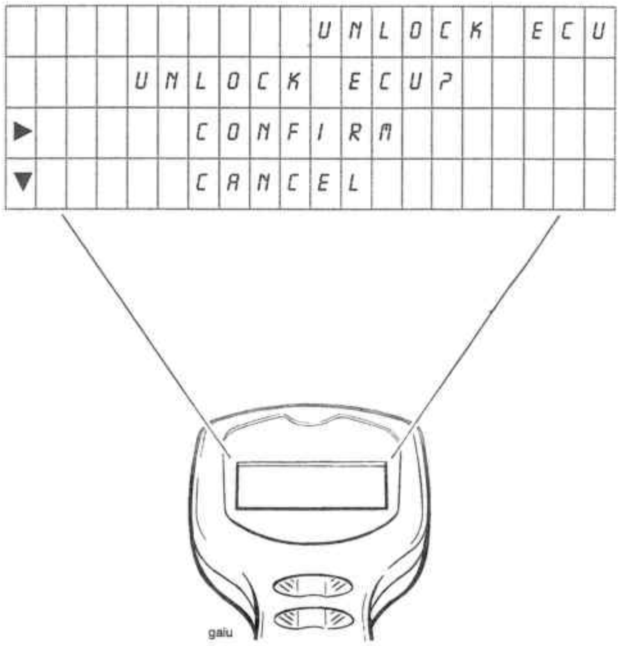
If the ignition is already on, the problem may be caused by bad connections, faulty ignition switch, cable break, faulty ECM, flat battery etc.

Press the Help key '?' for advice.

Rectify the problem and press the Validation key '⁎' to return to 'SWITCH ON BIKE IGNITION'.

Press the Validation key '⁎' again. If the tool accepts that the problem has been rectified, the tool will now automatically check for a locked ECM. Either 'UNLOCK ECU' will be displayed if the ECM is locked, or the 'MAIN MENU' (operation *9*) will be displayed if the ECM has previously been unlocked.

6 UNLOCK ECM

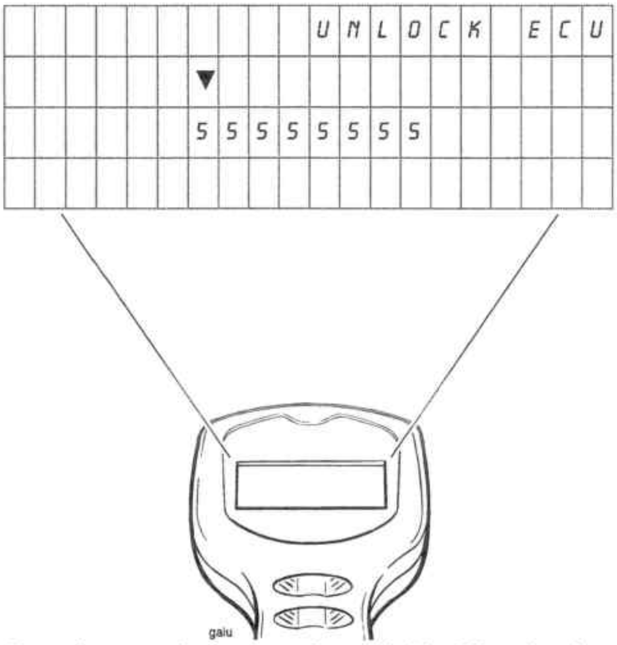


Use the 'Up' and 'Down' keys to position either 'CONFIRM' or 'CANCEL' opposite the cursor.

If 'CONFIRM' is selected, press the Validation key '⁎' to unlock the ECM. Operation *7* will be displayed.

If 'CANCEL' is selected, the 'MAIN MENU' (operation *9*) will be displayed. Note that if cancel is selected, the ECM will remain locked until the ECM unlock sequence is carried out, but all other diagnostic data will be available.

7 UNLOCK ECM



Enter the numerical password supplied by Triumph using the 'Up' and 'Down' keys as described below.

The number '55555555' is displayed, with the cursor pointing down at the first digit.

Press the 'Up' or 'Down' keys to change this digit to the first digit of the numerical password.

Press the Validation key '*'.

The cursor will now re-position over the second digit '5'. Enter the 2nd digit of the number in the same way.

Continue until all 8 digits of the number have been entered.

Note:

- **If any digit has been entered incorrectly, press the 'Return' key (↵) to start again.**

When all 8 digits have been entered correctly, press the Validation key '*'.

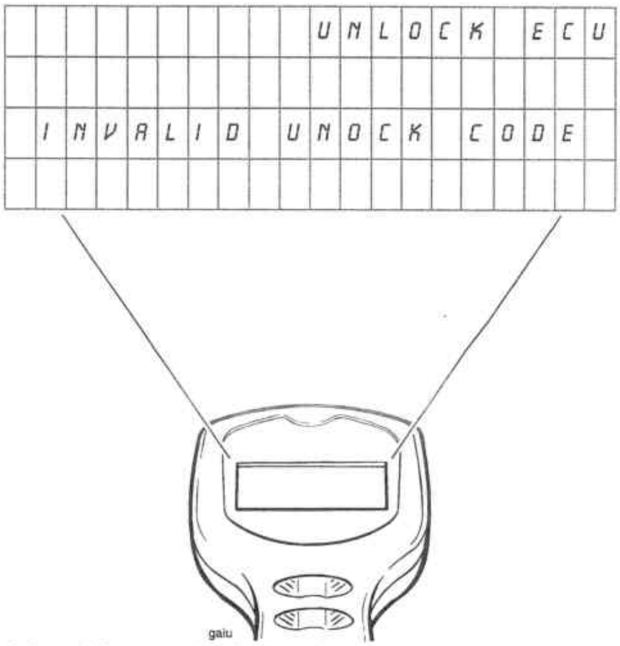
If the numerical password entered is invalid, the screen shown in operation *8* will be displayed.

If the numerical password entered is valid, the screen will display 'ECU SUCCESSFULLY UNLOCKED'. The ECM is now unlocked, and the engine can be started.

Note:

- **Each new Triumph model will have a unique pass code (i.e. all 2006 model year Daytona 675 motorcycles will have the same pass code). The pass code will be released via 'Triumph On Line' on a pre-arranged date. The specific date when this code will be released will vary from model to model.**

8 UNLOCK ECM

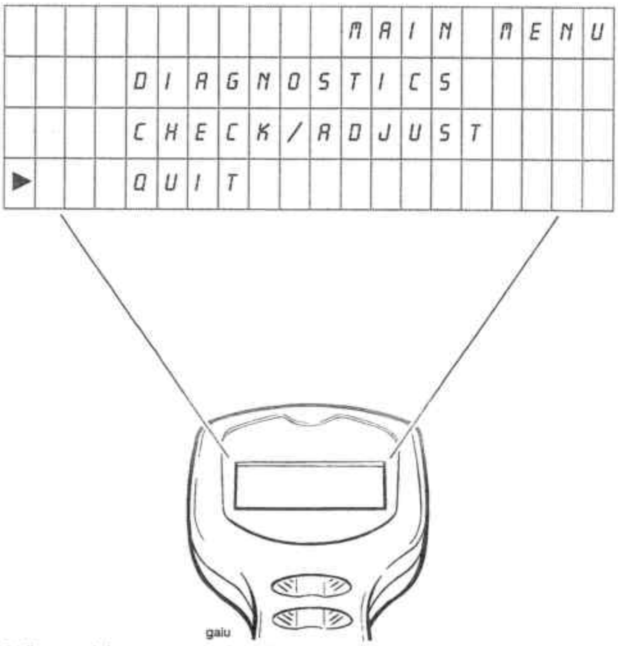


When this screen is displayed, an invalid unlock code has been entered.

Press the Validation key '*' key to return to the previous screen. Enter the correct lock code to unlock the ECM.

If an incorrect unlock code is entered three times, the screen will display 'INVALID UNLOCK CODE ECU TAMPER DETECTED RE-DOWNLOAD TUNE'. No further attempts to enter the unlock code will be allowed. The correct tune must then be re-downloaded in order to allow further attempts to unlock the ECM.

9 MAIN MENU



When this screen is displayed, you have to decide whether to proceed along one of two routes:

- 'DIAGNOSTICS'
- 'CHECK/ADJUST'

The 'DIAGNOSTICS' menu provides access to:

Current data e.g. actual engine temperature, engine speed etc.

Diagnostic Trouble Codes (DTCs) i.e. access to codes stored in the motor cycle ECM which indicate a confirmed fault(s) in the system.

Function tests e.g. of tachometer, water temperature gauge, fuel pump etc.

The 'CHECK/ADJUST' menu provides:

Checks i.e. build information, system data.

Adjustments e.g. adjustment of idle throttle balance etc., and entry of software updates.

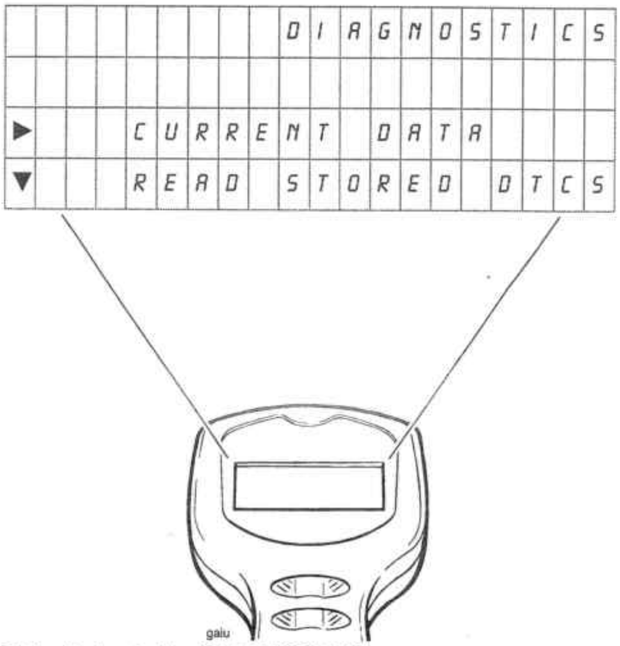
Use the 'Up and Down' keys to position the cursor opposite the desired choice, and press the Validation key '*'.

Either 'DIAGNOSTICS' (operation *10*) or 'CHECK/ADJUST' (operation *28*) will be displayed, dependent on the selection.

Note:

- **If 'QUIT' is selected and the validation key '*' pressed, the display will return to 'TRIUMPH MOTORCYCLES'.**

10 DIAGNOSTICS *(If 'DIAGNOSTICS' is selected)*



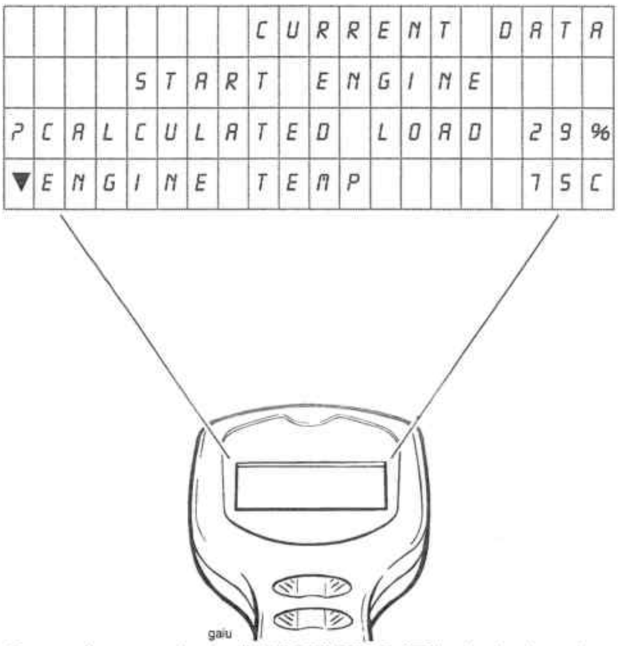
This display is the 'DIAGNOSTICS' menu.

Use the 'Up' and 'Down' keys to scroll the text until the horizontal arrowhead is positioned opposite the desired choice, and press the Validation key '*'.

The choices are:

- **'CURRENT DATA'** (see operation *11*).
- **'READ STORED DTCS'** (see operation *13*).
- **'CLEAR DTCS'** (see operation *18*).
- **'FUNCTION TESTS'** (see operation *19*).
- If **'QUIT'** is selected, the display will return to **'TRIUMPH MOTORCYCLES'**.

11 CURRENT DATA



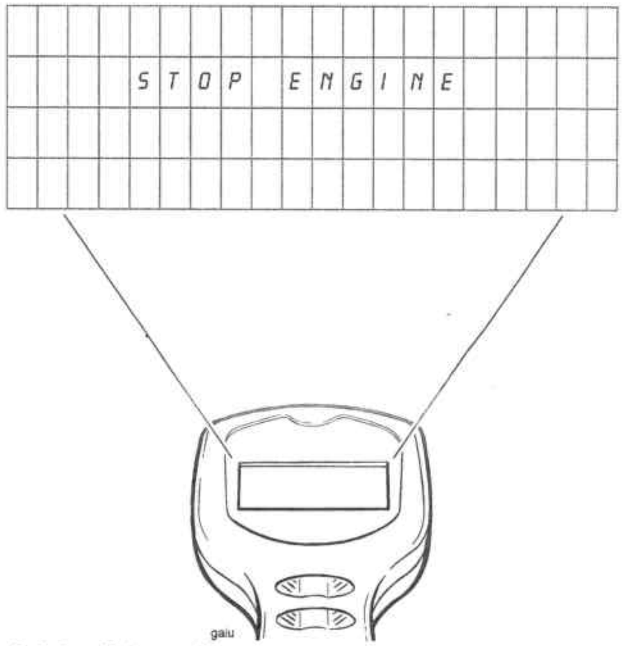
Start the engine. 'CURRENT DATA' includes the information shown in the table below which can be accessed by scrolling, using the 'Up' and 'Down' keys. At the end of each line of text, the actual reading at that instant is provided to assist diagnosis e.g. ENGINE TEMP - 75°C.

For a complete list of the items reported, see the table titled 'CURRENT DATA' earlier in this section.

If further clarification of any line of displayed text is required, scroll that line opposite the '?' symbol in the left hand column and press the Help key (?). Limited information on the selected topic will then be displayed.

Press any key to return to the 'CURRENT DATA' text. When all information has been noted, press either the Validation '✻' or Return (↵) keys.

12 STOP ENGINE



Switch off the engine.

As the tool is powered from the motorcycle, this will end the diagnostic session. To continue, return to the power-up section and select tests as required.

13 To select 'READ STORED DTCS' (Diagnostic Trouble Codes) from the MAIN MENU:

											M	A	I	N		M	E	N	U
▶				D	I	A	G	N	O	S	T	I	C	S					
				C	H	E	C	K	/	A	D	J	U	S	T				
								Q	U	I	T								

Use the 'Up' and 'Down' keys to position the cursor opposite DIAGNOSTICS.

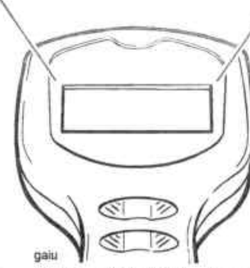
Press the Validation key '⁎' to display 'DIAGNOSTICS' menu.

Select 'READ STORED DTCS', and press the Validation key '⁎'.

'STORED DTCS' will be displayed.

14 STORED DTCS

									S	T	O	R	E	D		D	T	C	S
	D	T	C		C	O	U	N	T									0	2
?	P	0	1	1	7		•												
▼	P	0	2	0	1														



The second line - 'DTC COUNT', shows the number of DTCs stored in the ECM memory.

Lines 3 and 4 display up to two of the DTCs stored (if any). If additional DTCs are stored, this will be indicated by a downward pointing arrowhead, and it/they can be accessed using the 'Up' and 'Down' keys.

If there are no DTCs shown, press the Return key (↵) to return to MAIN MENU.

(If DTCs are present when the Return key is pressed, the display will read 'STORED DTCS, ERASE ALL DTC DATA YES/NO').

Information about each DTC can be obtained by scrolling the text until the appropriate code is opposite the '?' in line 3; then press the Help key (?).

DTC example:	P0117
Help text	MAP SENSOR LOW VOLTAGE

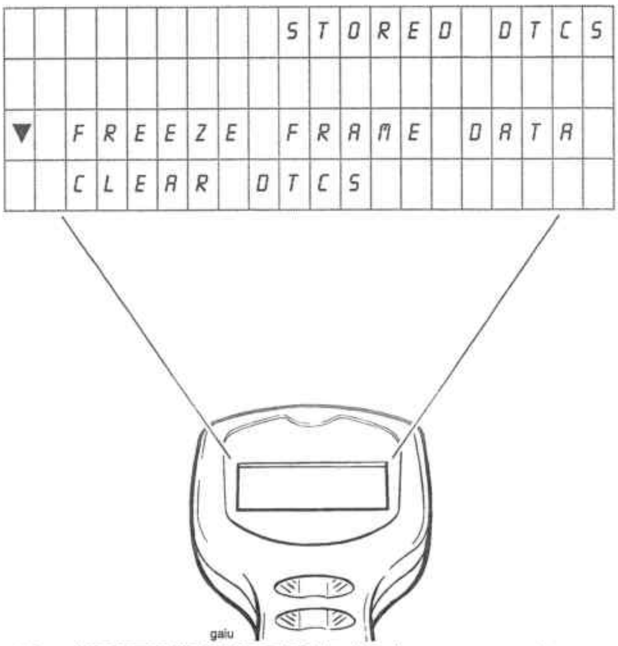
Press the Validation key '⁎' to continue (operation *15*).

IMPORTANT:

If a DTC has an asterisk (*) to its right, this indicates that a snap shot of engine data at the time the DTC was stored is available to aid your fault diagnosis. To access this information, press the Validation key '⁎' to go to operation *15* and open 'FREEZE FRAME DATA'.

TRIUMPH

15 Three options are now available:

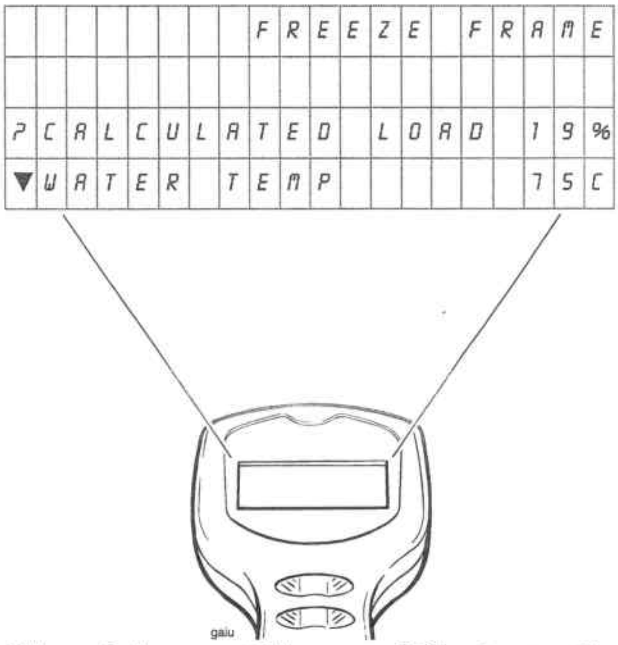


Align 'FREEZE FRAME DATA' with the cursor, and press the validation key '⁎' to display 'FREEZE FRAME' (see *16*).

Align 'CLEAR DTCS' with the cursor, and press the validation key '⁎' to display 'ERASE ALL DTC DATA' (see *18*).

Press the Return key (↵) to go back to 'STORED DTCS' (operation *14*).

16 FREEZE FRAME

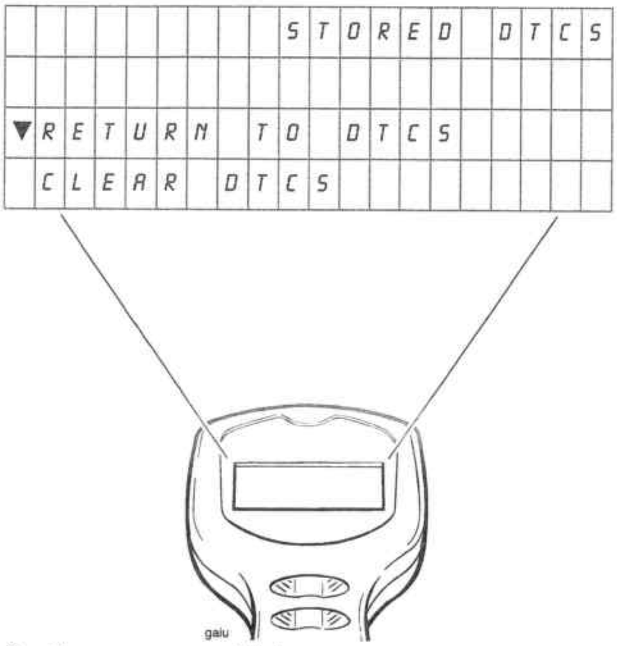


When a fault occurs which causes a DTC to be stored in the memory, the engine condition data at that instant is logged in the ECM. If another, more serious DTC is subsequently set, the original DTC data is automatically erased and new data associated with the latest DTC is logged in its place.

By selecting 'FREEZE FRAME', this information becomes available on the screen to aid diagnosis. Scroll the text up or down to view the data. More information can be gained by scrolling the text line in question to line 3 (?), then press the Help key (?) as before. Press the Validation key '⁎' to display 'STORED DTCS' (operation *17*).

For a complete list of the items reported, see the table titled 'FREEZE FRAME DATA' earlier in this section.

17 STORED DTCS



2 options are now available:

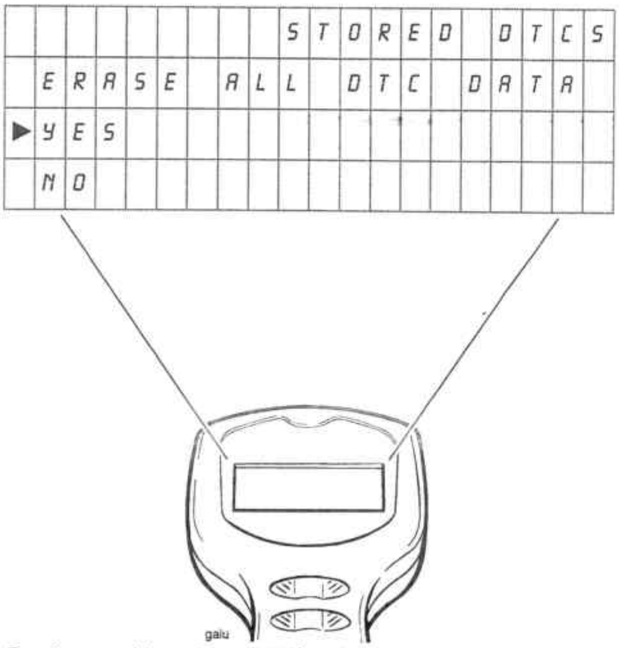
Scroll to 'RETURN TO DTCS' and press the Validate key '⁎' to return to operation *14*

Scroll to 'CLEAR DTCS' and press the Validation key '⁎' to go on to operation *18*

Note:

- **A full list of all the possible DTCs can be found earlier in this section.**

18 STORED DTCS, ERASE ALL DTC DATA



Scroll to position either 'YES' or 'NO' opposite the cursor.

If 'YES' is selected, press the Validation key '⁎' to erase all DTC data from the memory. 'MAIN MENU' will then be displayed.

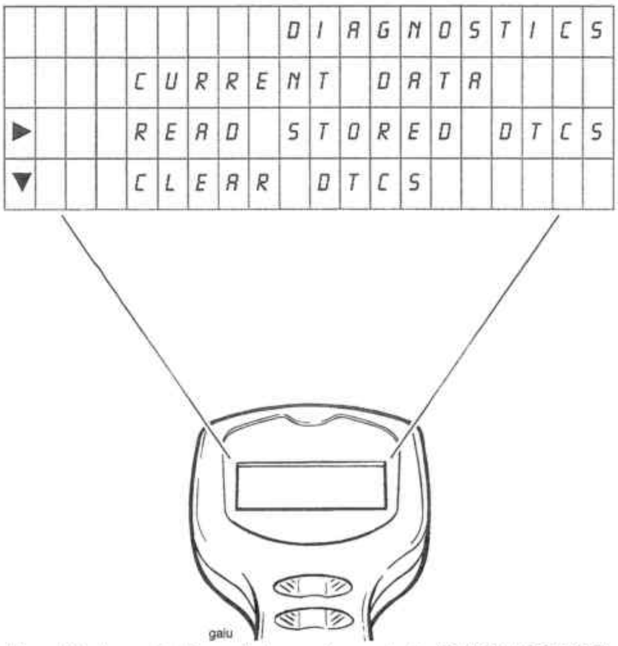
Note:

- **If you intend to examine the Function Tests, entry will be inhibited unless the DTCs have been erased.**

If 'NO' is selected, press the Validation key '⁎' to return to operation *14*.

That completes the DTC cycle.

19 To select 'FUNCTION TESTS' from the MAIN MENU:



Use 'Up' and 'Down' keys to select 'DIAGNOSTICS' menu.

The following choices are available.

Press the Validation key '⁎'. 'DIAGNOSTICS' will be displayed.

Select 'FUNCTION TESTS', and press the Validation key '⁎'.

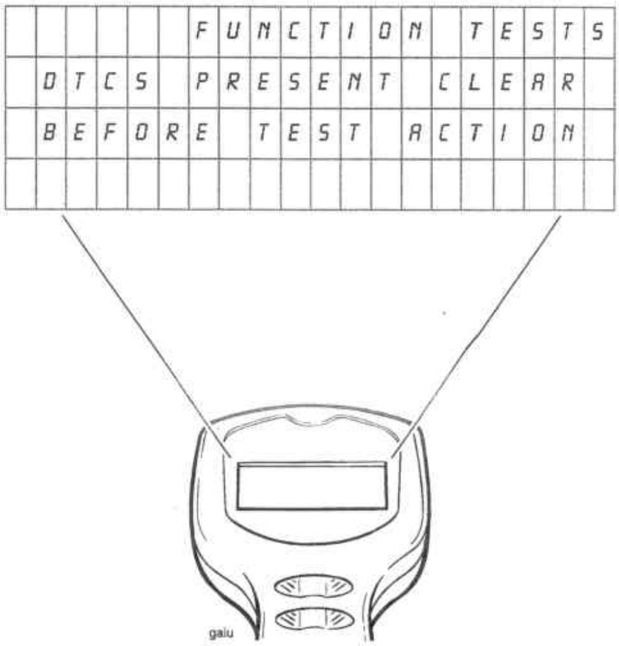
If no DTCs are stored, 'FUNCTION TEST' will be displayed (see operation *21*).

If one or more DTCs are stored, the message 'DTCS PRESENT CLEAR BEFORE TEST ACTION' will be displayed (see operation *20*).

Note:

- **The diagnostic tool will not allow Function Tests to be accessed until all DTCs in the memory are removed.**

20 FUNCTION TESTS



To clear the DTCs, press the Validation key '⁎'. 'STORED DTCS' will be displayed (see operation *14*).

Proceed as before via operations *15* to *18* Scroll to 'YES' and press the Validation key '⁎' to erase all DTC data; the MAIN MENU will be displayed again.

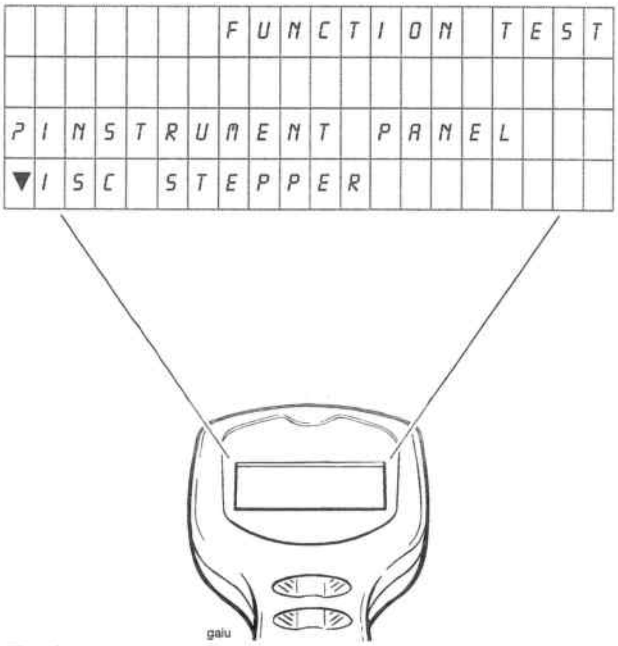
Note:

- **The fault(s) which caused the DTCs to be set must be rectified and cleared before continuing the Function Tests.**
- **A full list of all the possible DTCs can be found earlier in this section.**

Select 'DIAGNOSTICS' menu and 'FUNCTION TESTS' again pressing the Validation key '⁎' each time.

Because the DTCs have now been erased, 'FUNCTION' TEST' (operation *21*) will now be displayed.

21 FUNCTION TEST



The following can be tested:

a) **Instrument panel**
b) **Idle speed control stepper**
c) **Purge valve**
d) **Fuel pump prime**
e) **Cooling fan operation**
f) **Fuel pump operation**
g) **Secondary air injection solenoid**
h) **Exhaust butterfly valve actuator**
i) **Air intake flap solenoid.**

If the fault is electrical, this will then be reported as a DTC.

Instrument Panel test: A signal is sent which should cause:

- the tachometer to read approximately 7,500 RPM for 10 seconds.
- the water temp gauge to Illuminate, one bar at a time until all bars are illuminated, at which point the high temperature warning light will illuminate.
- the MIL and low fuel warning light to flash alternately with the neutral light.
- the speedometer to read 100 km/h* for 10 seconds.

* Or the imperial equivalents.

Idle speed control stepper: A signal is sent which should cause the stepper to be driven to the fully closed position, then to the fully open position, pausing briefly in each position. DTCs are set if a malfunction is found.

Purge valve (California models only): This test allows you to check operation of the valve. The valve will be switched on and then off every 2 seconds for 10 seconds. To detect valve operation, use a stethoscope to listen for valve operation. DTCs are set if a malfunction is found.

Fuel pump prime: This test provides you with the means to physically check the pump operation. The fuel pump will run for 10 seconds. DTCs are set if a malfunction is found.

Cooling fan test: A signal is sent which should cause the fan to operate for a 10 second period. DTCs are set if a malfunction is found.

Fuel pump operation: This test provides you with the means to physically check the pump operation. DTCs are set if a malfunction is found. The pump is energised when the test is confirmed and ended when the Validation key '⁎' is pressed for a second time.

Secondary air injection solenoid: This test allows you to check operation of the solenoid. The valve will be switched on and then off every 2 seconds for 10 seconds. DTCs are set if a malfunction is found.

Exhaust butterfly valve actuator: A signal is sent which should cause the actuator to be driven to the fully open position, then to the fully closed position, every 2 seconds for 10 seconds. DTCs are set if a malfunction is found. A visual check of the cable and butterfly valve operation should be made to confirm correct operation.

Air intake flap solenoid: This test provides you with the means to physically check the solenoid operation. DTCs are set if a malfunction is found. Note that the flap will only operate as long as the reservoir still retains a vacuum. Check the flap operation as the solenoid operates.

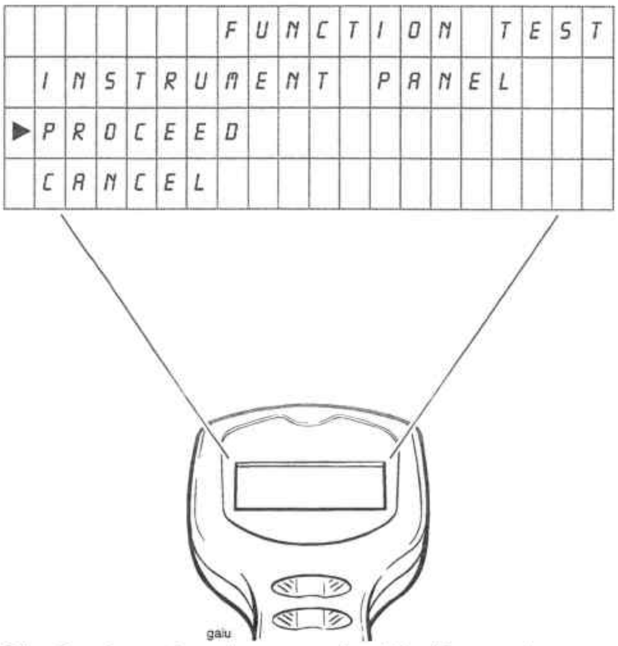
To verify the correct operation of the air intake flap with the engine running, start the engine and briefly raise the engine speed above 4500 rpm. The flap should be seen to open as the engine speed rises and close again as the engine speed falls.

Press the Help key (?) for more information.

Note:

- **If the Return key (↵) is pressed, the tool will return to 'DIAGNOSTICS' menu (operation *10*).**

22 FUNCTION TEST



The function selected at operation *21* will now show on line 2. To show an example of this, we have chosen the 'INSTRUMENT PANEL' test.

If you press the Help key (?) help relating to the specific test will be given. In this example, the screen will now read:

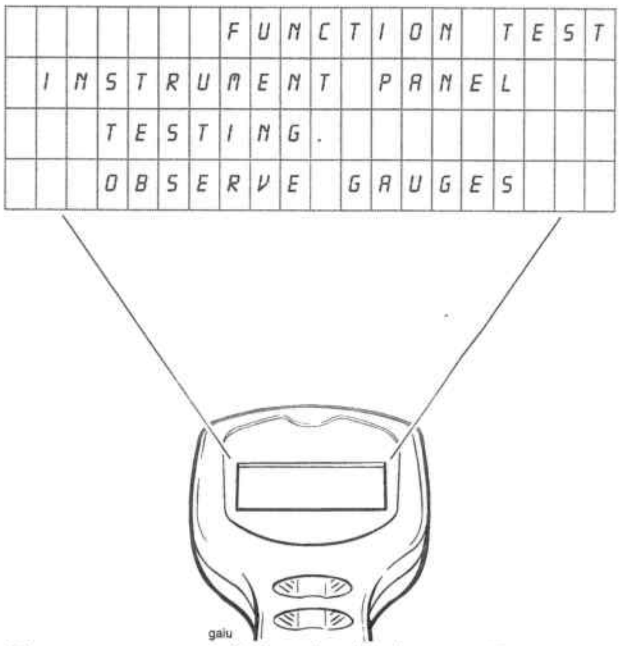
- **TACHOMETER - 7500 RPM**
- **TEMP GAUGE - Illuminates one bar at a time until all bars are illuminated, at which point the high temperature warning light will illuminate.**
- **WARNING LIGHTS - The MIL and low fuel warning light will flash alternately with the neutral light.**
- **SPEEDOMETER - 100 km/h***

* Or the imperial equivalents.

If you wish to cancel that selection, scroll to 'CANCEL' and press the Validation key '✳'. The display will return to operation *21*.

If you wish to test the component selected, scroll to 'PROCEED' and press the Validation key '✳'.

23 FUNCTION TEST

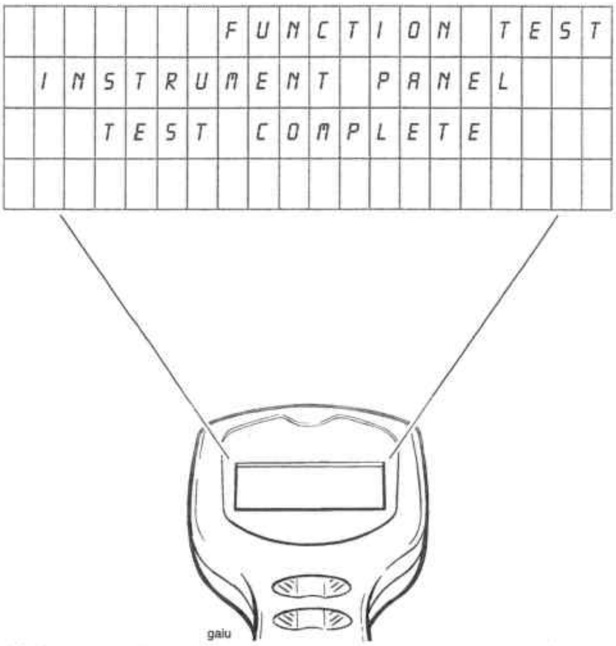


The screen now displayed will be specific to the component being tested:

In the example selected - 'INSTRUMENT PANEL', the instruction is to observe the gauges.

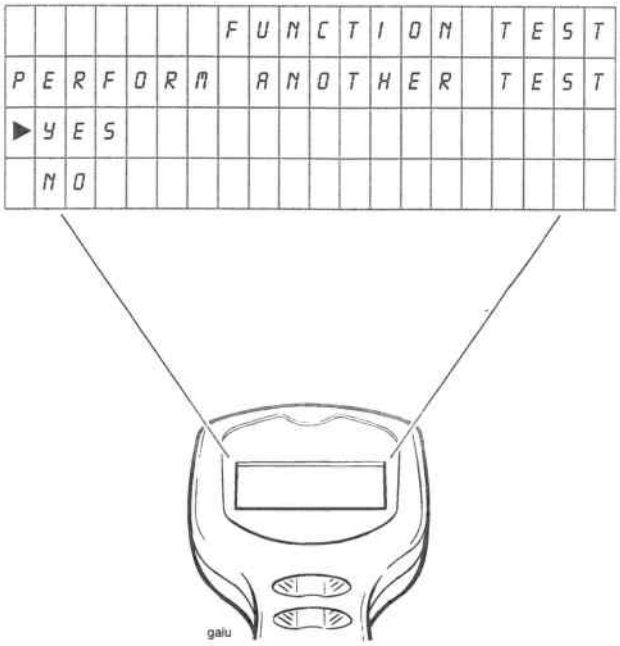
After a period of time, the screen will automatically change to either 'TEST COMPLETE' (see operation *24*) which will indicate a satisfactory completion, or to 'TEST FAILED' (see operation *26*) which will indicate failure.

24 FUNCTION TEST



If the test is satisfactory the display will read 'TEST COMPLETE'. Press the Validation key '*' to display 'FUNCTION TEST' (operation *25*).

25 FUNCTION TEST

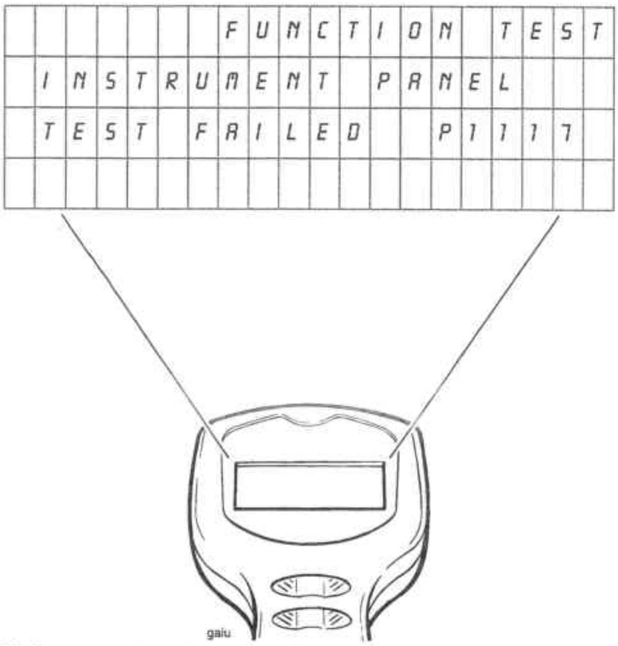


This display allows you to decide whether you wish to test another component.

Either - position the cursor on line 3 'YES' and press the Validation key '*' to return to the 'FUNCTION TEST' selection menu,

or - position the cursor on line 4 'NO' and press the Validation key '*' to return to 'DIAGNOSTICS' menu (operation *10*).

26 FUNCTION TEST



If the test selected at operation *23* is unsatisfactory, a DTC will be displayed on line 3 of this display.

Press the Help key (?) to access the diagnosis information associated with that code.

Press the Validation key '*' if you wish to test another component (operation *25*).

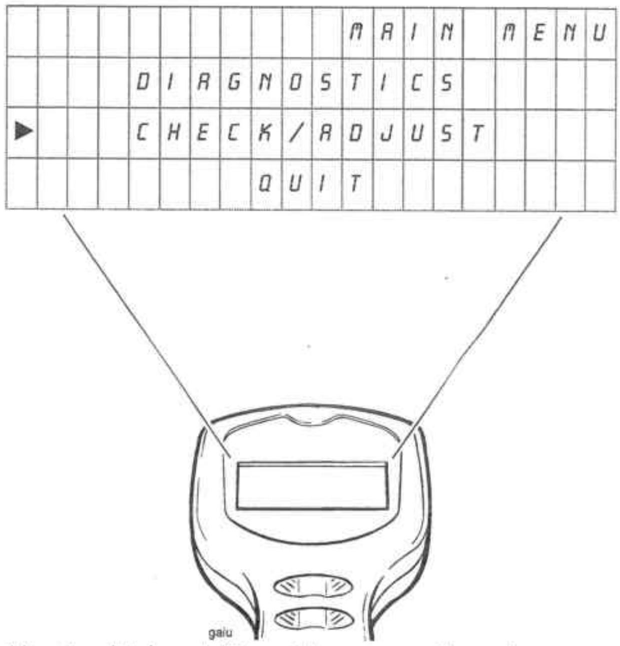
Note:

- **Any DTCs logged in the system will be automatically cleared at this point.**

To return to the 'DIAGNOSTICS' menu, Select 'QUIT' and press the Validation key '*' to return to the 'MAIN MENU' (operation *9*).

That completes the FUNCTION TESTS cycle.

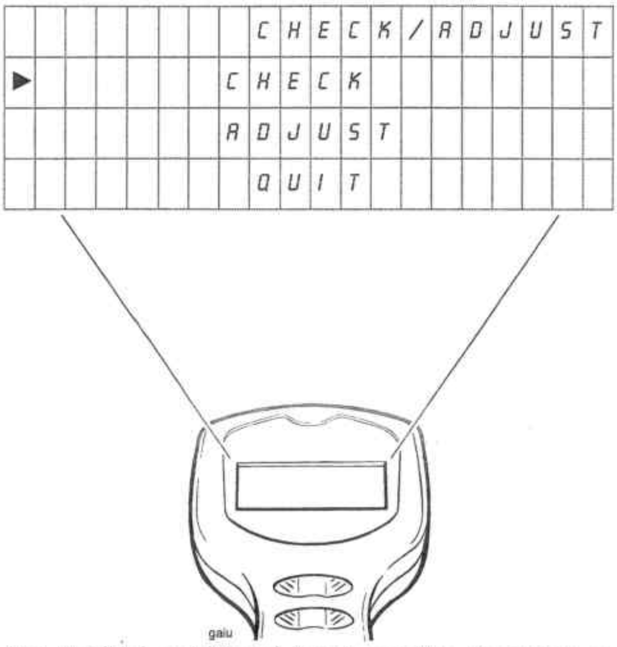
27 To select 'CHECKS/ADJUSTMENTS' from the MAIN MENU (operation 9):



Use the 'Up' and 'Down' keys to position the cursor opposite 'CHECK/ADJUST'.

Press the Validation key '*'; the 'CHECK/ADJUST' menu will be displayed.

28 CHECK/ADJUST



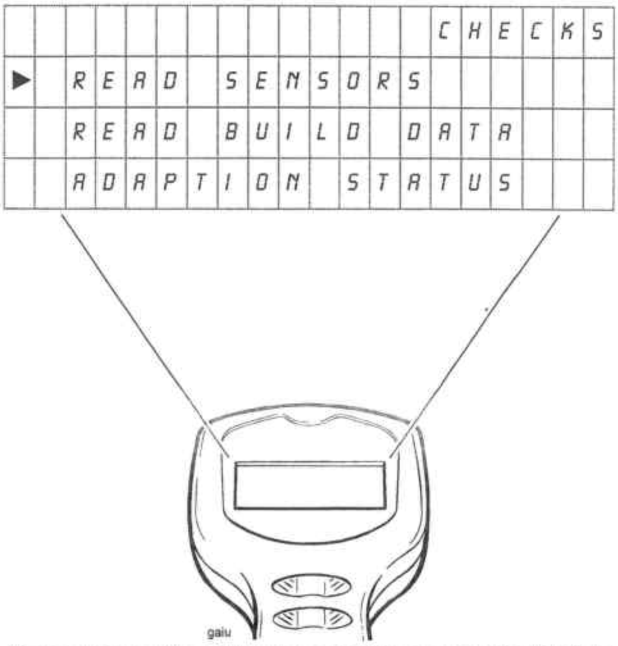
Use the 'Up' and 'Down' keys to position the cursor as follows, and then press the Validation key '∗':

Opposite 'CHECK' - 'CHECKS' will be displayed (operation *29*).

Opposite 'ADJUST' - 'ADJUST' will be displayed (operation *34*).

Opposite 'QUIT' - to return to 'MAIN MENU' (operation *9*).

29 CHECKS



You now have the option to access the motorcycle 'BUILD DATA' or the 'SYSTEM DATA', or to quit.

Position the cursor as follows and then press the Validation key '∗':

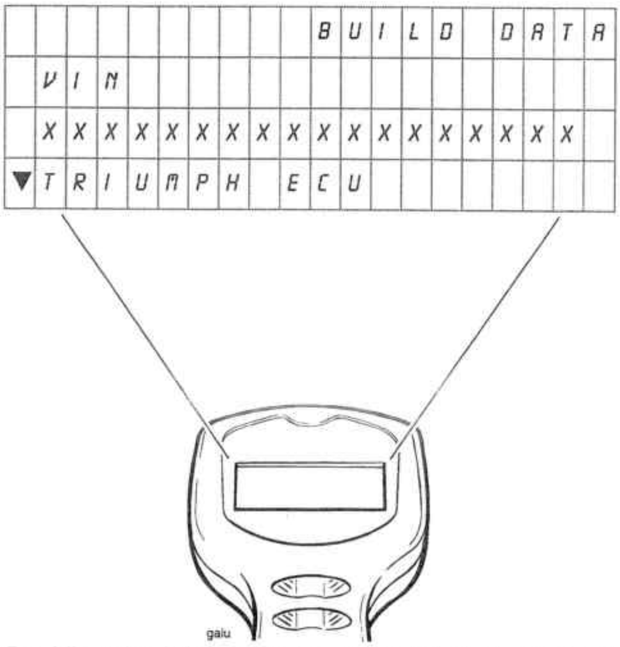
Opposite 'READ SENSORS' - 'SENSOR DATA' (operation *31*) will be displayed.

Opposite 'READ BUILD DATA' - 'BUILD DATA' (operation *30*) will be displayed.

Opposite 'ADAPTION STATUS' - 'ADAPTION DATA' (operation *32*) will be displayed if the coolant temperature is higher than 90°C. If not, a holding screen will be displayed indicating the current temperature.

Opposite 'QUIT' - to return to 'MAIN MENU' (operation *9*).

30 BUILD DATA

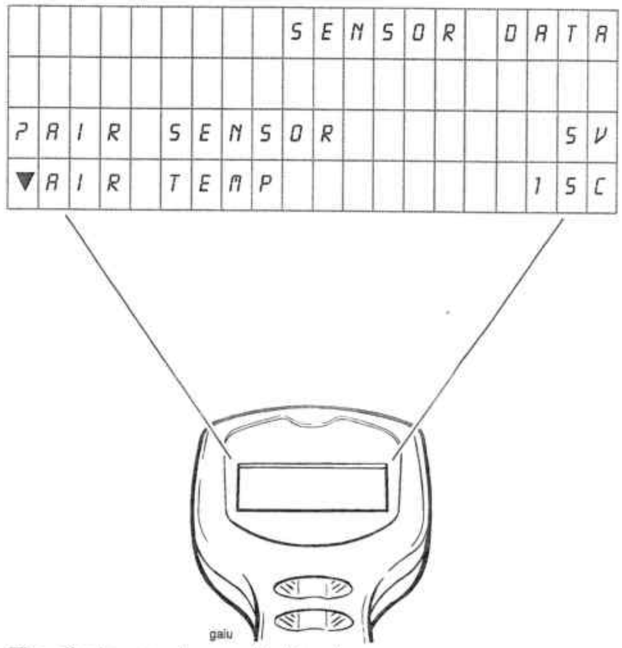


Providing the information was recorded at the time of build, the display will show the following information relating to the motorcycle under test by scrolling up and down. Before displaying the recorded information, the tool will briefly display the message, 'PLEASE WAIT, CHECKING BUILD DATA'.

- Vehicle Identification Number (VIN)
- Triumph ECM part number
- Manufacturer's ECM part number
- ECM Serial number
- Tune Number

Press the Validation '*' keys to return to 'CHECK/ADJUST' menu (operation *28*).

31 SENSOR DATA



The display can be scrolled to show:

The status of the various sensors and actuators. This is split into three sections:

- Voltages and Pressures
- Throttles, Coils and Injectors
- Other

To obtain further data information, scroll the appropriate line to the help key mark (?) and press the Help key.

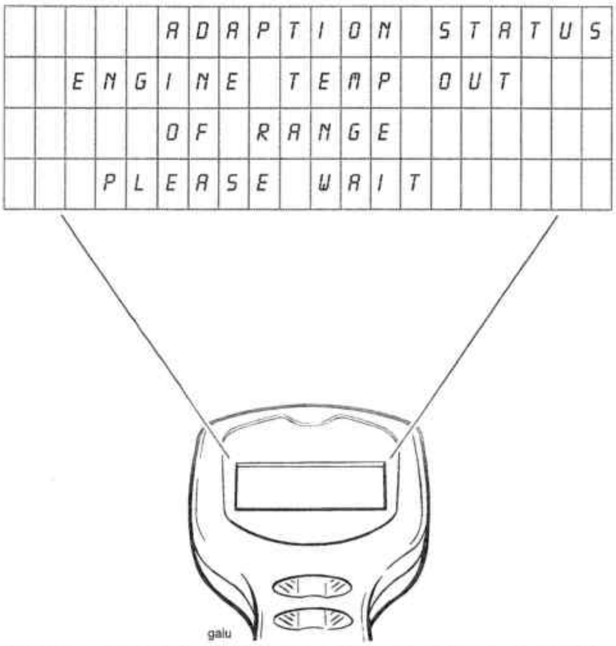
Note:

- **The help information shows the likely range of readings for a correctly functioning system at normal operating temperature.**

That completes examination of the Checks.

Press the Validation key '*' to return to 'CHECK/ADJUST' (operation *28*).

32 ADAPTION STATUS

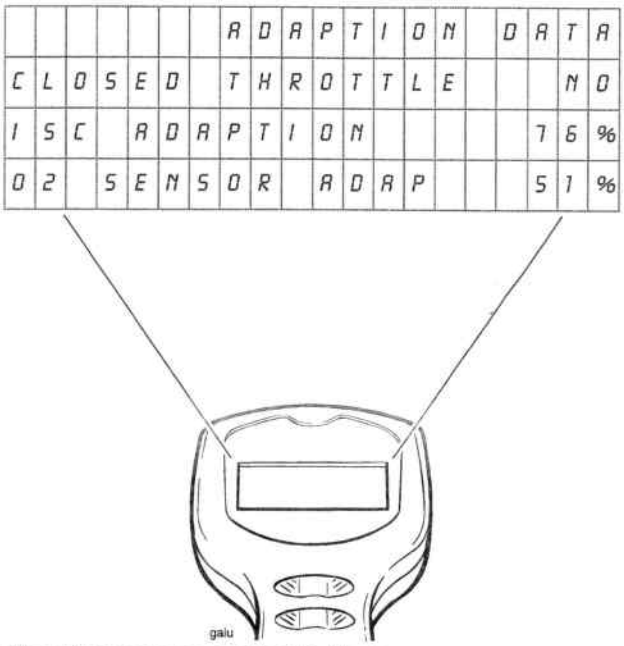


Because adaption only takes place at normal operating temperature, the above screen will be displayed until the engine reaches normal operating temperature.

Until the engine warms or cools to the correct temperature range, the tool will not allow access to any other functions. If you wish to escape from this area (and not carry out the adjustment) switch off the ignition and disconnect the tool.

Once the correct temperature range has been reached, the ADAPTION DATA screen (operation *33*) will automatically be displayed.

33 ADAPTION DATA



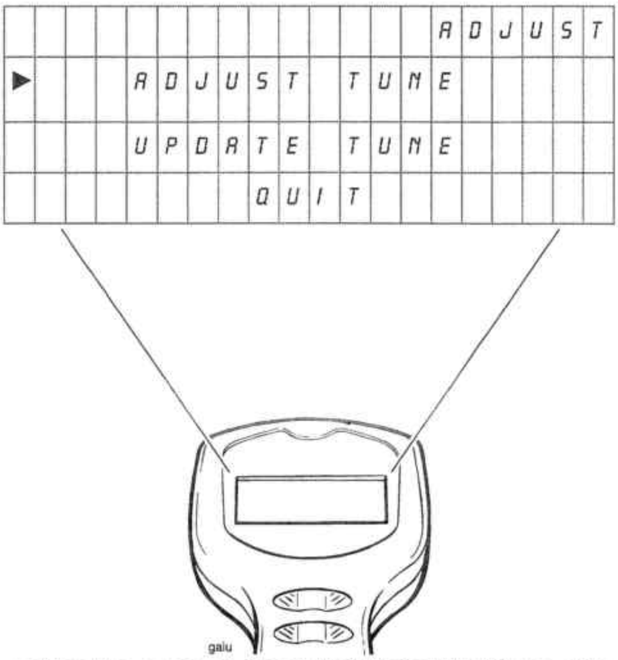
The display can be scrolled to show:

The adaption status of the various sensors and actuators involved in the adaption process will give an indication as to whether or not the vehicle is correctly adapted. If the readings show an incorrect adaption status, see page *10-128* for additional information and the actions necessary to force adaption.

The data displayed under this option is:

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)	%

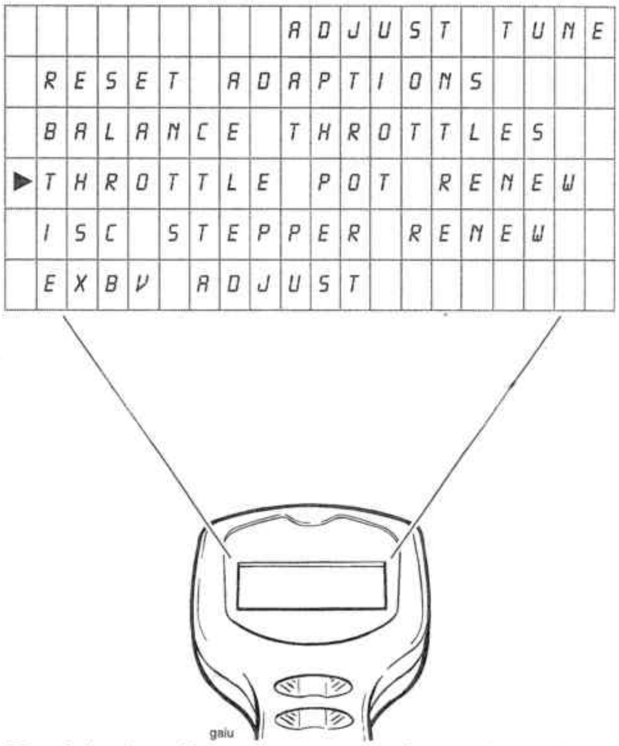
34 ADJUST



Position the cursor on line 2 'ADJUST TUNE' if you wish to check and/or adjust the values of certain tune items. Then press the Validation key '⁎' to display ADJUST TUNE (see operation *35*).

In special circumstances, Triumph will request you to introduce a completely new engine tune. Given this situation, select 'UPDATE TUNE' and press the Validation key '⁎' (see operation *38*).

35 ADJUST TUNE



The following allow adjustments to be made to items which affect the engine operation:

Position the cursor opposite the setting you wish to adjust and press the Validation key '⁎'.

RESET ADAPTIONS - See operation *36*.

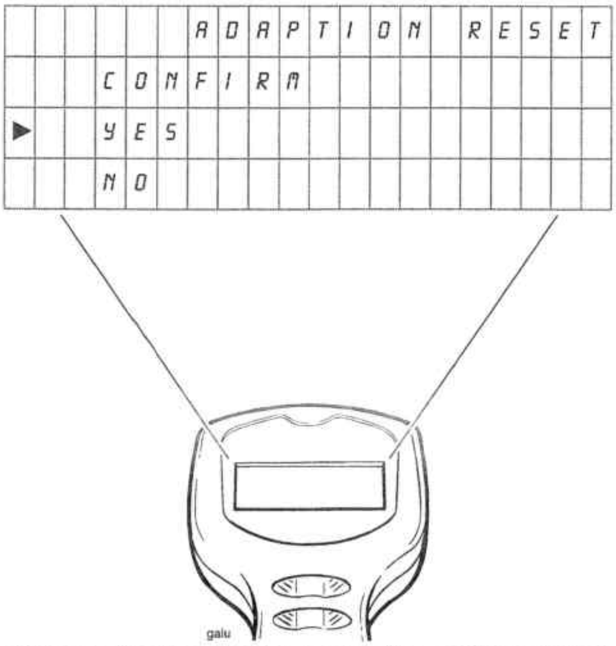
BALANCE THROTTLES - See operation *37*.

THROTTLE POT RENEW - See page *10-123* for details on when and how to use this function.

IDLE SPEED CONTROL STEPPER RENEW - See page *10-125* for details on when and how to use this function.

EXHAUST BUTTERFLY VALVE ADJUST - See page *10-137* for details on when and how to use this function.

36 ADJUST TUNE (adaption reset)



After selecting the adaption reset option, confirm or reject the option by positioning the cursor opposite the option chosen and press the Validation key '*'.

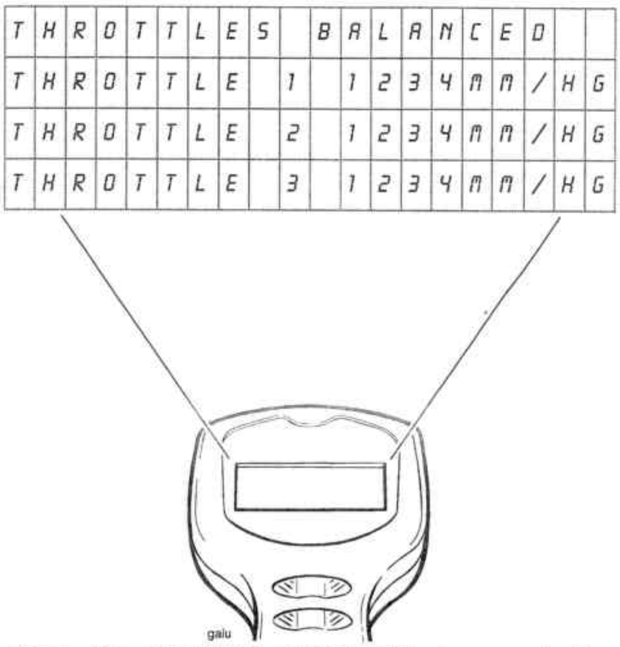
If YES is chosen, a screen will confirm that adaptions have been reset.

If NO is chosen, you will be returned to the adjust tune menu.

Note:

- **Resetting the adaption values does not adapt the motorcycle. This can only be done by the method explained later in this section. Adaption reset only returns adaption values to their 'start' point.**

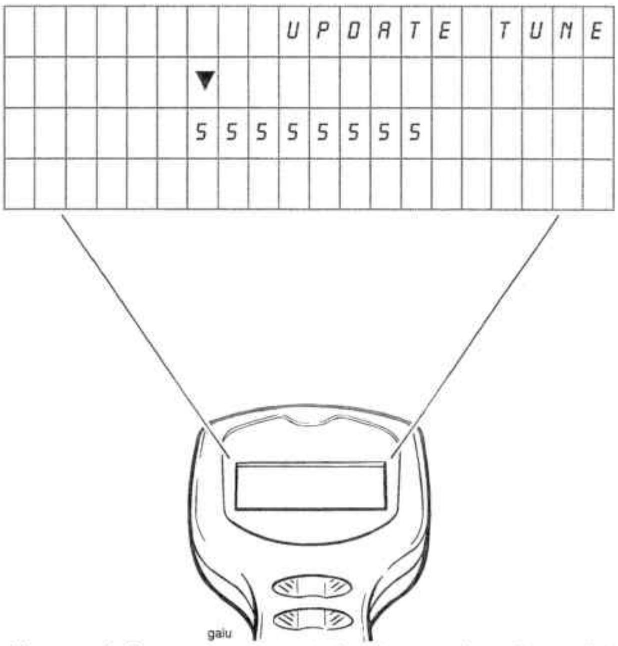
37 BALANCE THROTTLES



Using the BALANCE THROTTLES command, the throttles may be balanced without the need to connect an external device to measure the vacuum levels in each throttle body. The diagnostic tool displays data taken from the manifold absolute pressure sensor reading for each throttle.

Once throttle imbalance has been reduced to a pre-determined level, the top line of information will display the word *BALANCED*. Under any other conditions where imbalance is detected, nothing will be displayed indicating that the throttles require balancing.

38 UPDATE TUNE



(Accessed from operation *34*). On receipt of special instructions from Triumph you may be asked to input a completely new engine tune.

To do this, they will give you a numerical password which must be entered using the 'Up' and 'Down' keys as described below.

The number '55555555' is displayed, with the cursor pointing down at the first digit.

Press the 'Up' or 'Down' keys to change this digit to the first digit of the numerical password.

Press the Validation key '⁎'.

The cursor will now re-position over the second digit '5'. Enter the 2nd digit of the number in the same way.

Continue until all 8 digits of the number have been entered.

Note:

- **If any digit has been entered incorrectly, press the 'Return' key (↵) to start again.**

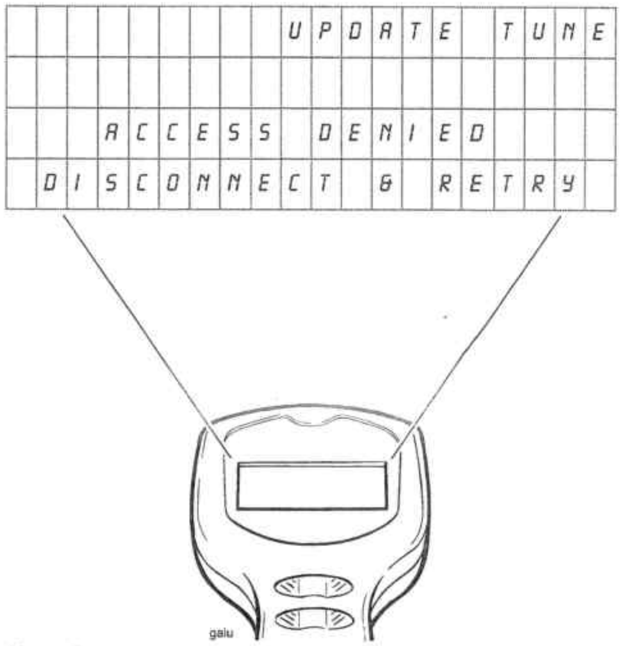
When all 8 digits have been entered correctly, press the Validation key '⁎'.

After entering the final digit, press the Validation key '⁎' again.

If the numerical password entered is invalid, the screen shown in operation *39* will be displayed.

If the password number is valid, the tool will briefly display the message, 'PLEASE WAIT, CHECKING ECU TYPE' then, 'UPDATE TUNE' (operation *40*) will be displayed.

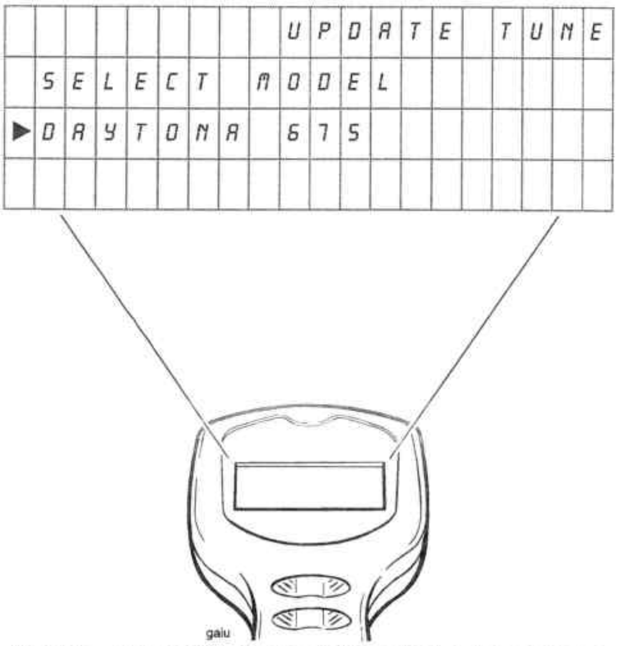
39 UPDATE TUNE



If the Password number has been incorrectly entered, the screen will display 'ACCESS DENIED'. Press the Validation key '⁎' to return to MAIN MENU (operation *9*) and start again.

If after a second attempt the entry is still invalid, the screen will display 'ACCESS DENIED DISCONNECT AND RETRY'. The diagnostic tool must be disconnected and the complete procedure re-started.

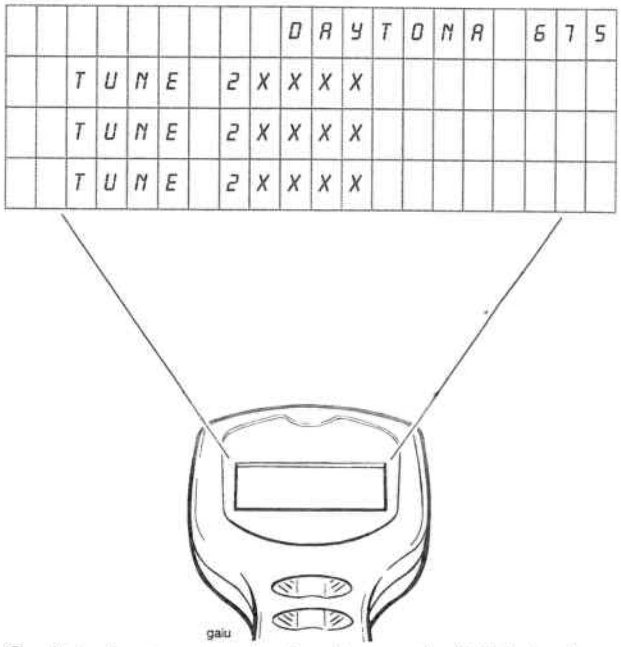
40 UPDATE TUNE



Align the cursor with the model to which a tune is to be downloaded and, when satisfied that the selection is correct, press the validation key '⁎'.

Once a model has been selected and the validation key pressed, screen *41* will be displayed.

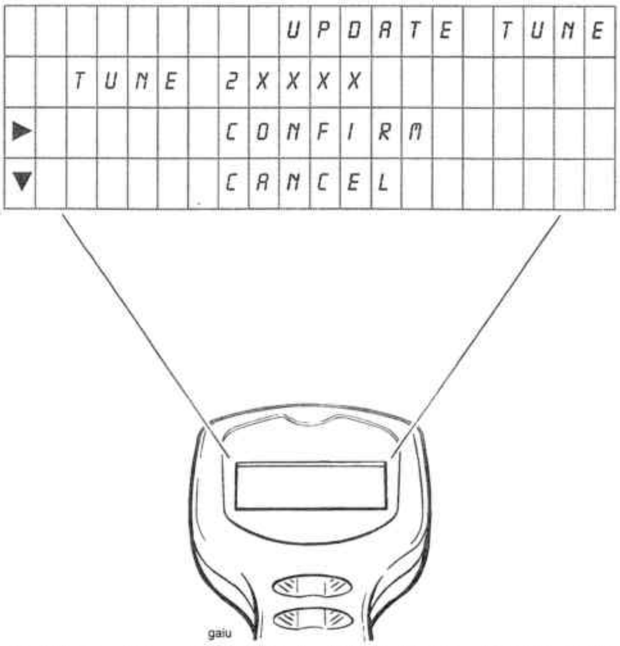
41 UPDATE TUNE



Scroll to the tune required and press the Validation key '⁎' to move on to operation *42*.

Press the help key for information on the applicability of each tune number.

42 UPDATE TUNE



Scroll to either 'CONFIRM', 'CANCEL' or 'QUIT' (quit option will not be visible until the text has been scrolled) then press the Validation key '⁎'.

If 'QUIT' has been selected - this will return to MAIN MENU (operation *9*)

If 'CANCEL' has been selected - return to operation *41*.

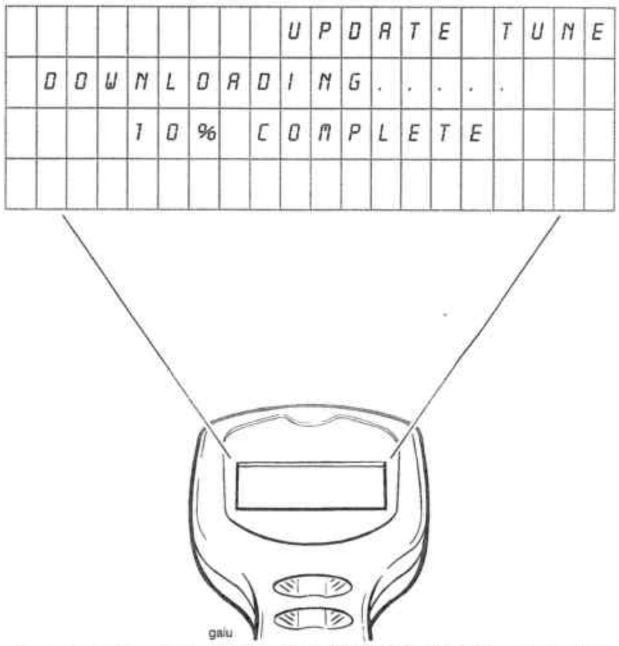
If 'CONFIRM' has been selected, the diagnostic tool will now automatically check that the tune selected is compatible with the ECM fitted motorcycle.

If the tune is compatible, downloading will begin.

If the tune is not compatible the message 'INCOMPATIBLE TUNE SELECTED - PLEASE RESELECT' will be displayed.

Press the Validation key '⁎' to return to operation *40*, and reselect the correct tune.

43 UPDATE TUNE (confirm selected)



The screen will show 'DOWNLOADING', and the selected software will be automatically downloaded into the ECM.

When complete, the screen will display 'DOWNLOAD COMPLETE'.

Press the Validation key '⁎' to return to the 'MAIN MENU' (operation *9*).

If downloading has been unsuccessful the screen will display 'DOWNLOAD FAILED'. Should this message appear, refer to operation *44*, restarting tune download.

Press the Validation key '⁎' to return to the 'MAIN MENU' (operation *9*).

44 RESTARTING TUNE DOWNLOAD

Caution

If, for any reason downloading is interrupted, the ECM will not function and tune download cannot be restarted in the normal way. This is because the ECM's operating system has been erased from the ECM's memory and has not yet been fully replaced.

Download interruption can occur for a variety of reasons such as: Accidental disconnection of the tool, a flat battery, turning the ignition switch to 'OFF' during download etc.

In these circumstances, a special-tool key-press-sequence must be followed which is described below.

To restart download, switch the motorcycle ignition to 'OFF' and disconnect the tool. Reconnect the tool, switch the motorcycle ignition to 'ON', and scroll through to the screen shown below.

	T	R	I	U	M	P	H		M	O	T	O	R	C	Y	C	L	E	S
			D	I	A	G	N	O	S	T	I	C		T	O	O	L		
S	O	F	T	W	A	R	E		V	E	R	S	I	O	N				
					2	0	0	6	-	0	1								

From this screen, use the following button press sequence:

HELP (?) - HELP (?) - RETURN (↵) - HELP (?) VALIDATE (✻).

The update tune screen (operation *38*) will then be displayed. From that screen, download can be restarted in the normal way.

Note:

- **The software version number is not relevant to this procedure. All versions of the diagnostic software will operate in the way described.**

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. E.G. 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 coloured and shaped connectors are used in the ECM, which ensures correct connection is always made. The connectors on the ECM are coloured black and grey, and correspond with identical coloured connectors on the main harness.**

Caution

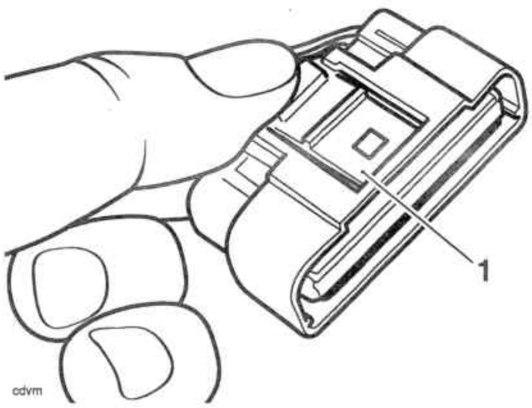
When disconnecting a connector, never pull directly on the wires as this may result in cable and connector damage.

Caution

Never disconnect the 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 beneath the fuel tank, on the upper section of the airbox.**

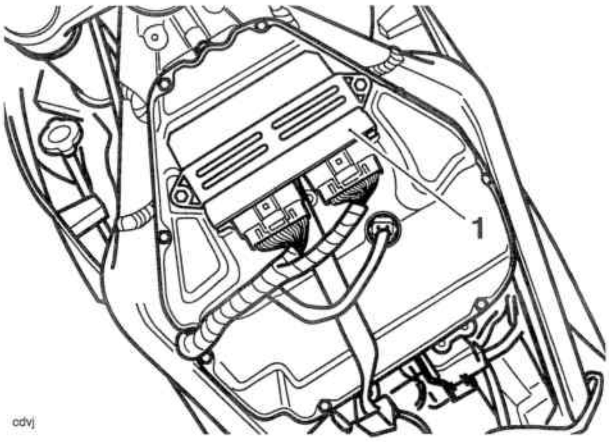
Reconnection of ECM connectors

Note:

- **Two different coloured and shaped connectors are used in the ECM, which ensures correct connection is always made. The connectors on the ECM are coloured black and grey, and correspond with identical coloured connectors on the main harness.**

Caution

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



1. ECM

1. Fit the first connector into its socket and, whilst holding the connector in place, insert it fully into the ECM until the locking device retains it.
2. Repeat the above for the second connector.

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.

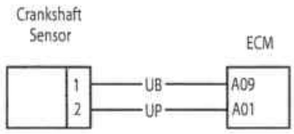
Crankshaft Sensor

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

Pinpoint Tests

Test	Result	Action
1 Check terminal and cable integrity: - ECM pin A01 - ECM pin A09	OK	Disconnect sensor and proceed to test 2
	Faulty	Rectify fault, proceed to test 6
2 Check cable for short circuit: - ECM pin A01 to earth - ECM pin A09 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 A01 to ECM pin A09	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



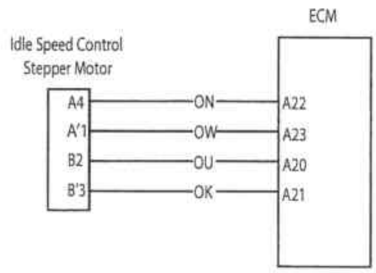
Idle Speed Control

Fault Code	Possible cause	Action
P0505	ISC stepper motor / wiring fault	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:	OK	Proceed to test 2
- ECM pin A20 - ECM pin A21 - ECM pin A22 - ECM pin A23	Faulty	Rectify fault, proceed to test 7
2 Check resistance value:	4Ω to 12Ω	Disconnect stepper motor and proceed to test 3
- ECM pin A20 to ECM pin A21 - ECM pin A22 to ECM pin A23	Open circuit	Proceed to test 4
	Short circuit	Disconnect stepper motor and proceed to test 5
3 Check cable for short circuit:	OK	Proceed to test 7
- ECM pin A20 to earth - ECM pin A21 to earth - ECM pin A22 to earth - ECM pin A23 to earth	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity:	OK	Proceed to test 6
- ECM pin A22 to stepper motor pin A - ECM pin A23 to stepper motor pin A1 - ECM pin A20 to stepper motor pin B - ECM pin A21 to stepper motor pin B1	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit:	OK	Proceed to test 6
- ECM pin A22 to ECM pin A23 - ECM pin A20 to ECM pin A21	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check stepper motor resistance:	4Ω to 12Ω	Proceed to test 7
- Motor pin A to motor pin A1 - Motor pin B to motor pin B1	Faulty	Renew stepper motor, proceed to test 7
7 Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of stepper motor	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



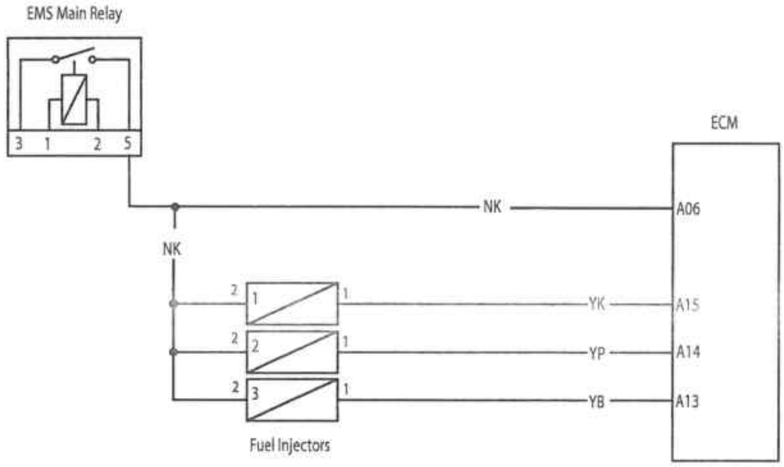
Fuel Injectors

Fault Code	Possible cause	Action
P0201/02/03	Injection system fault - Injector 1/2/3 - 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:	OK	Proceed to test 2
- ECM pin A15 - ECM pin A14 - ECM pin A13	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) - ECM pin A06 to ECM pin A13 (injector 3)	11.0W to 12.5W	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:	OK	Proceed to test 7
- ECM pin A15 to earth - ECM pin A14 to earth - ECM pin A13 to earth	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity:	OK	Proceed to test 6
- ECM pin A06 to relevant injector pin 2 - ECM pin A15 to injector 1 pin 1 - ECM pin A14 to injector 2 pin 1 - ECM pin A13 to injector 3 pin 1	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit to supply box:	OK	Proceed to test 6
- ECM pin A06 to ECM pin A15 (inj 1) - ECM pin A06 to ECM pin A14 (inj 2) - ECM pin A06 to ECM pin A13 (inj 3)	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check relevant injector resistance:	11.0W to 12.5W	Proceed to test 7
- Injector pin 1 to injector pin 2	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

Circuit Diagram



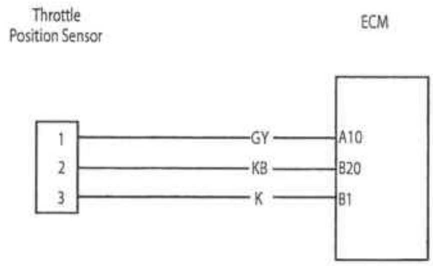
Throttle Position Sensor

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 1 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 3	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



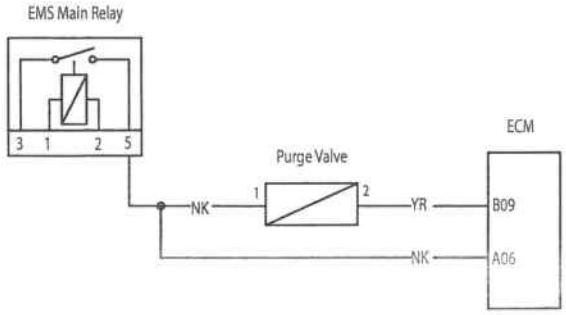
Purge Valve

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	24Ω to 28Ω	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 B06 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 B06 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	24Ω to 28Ω	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



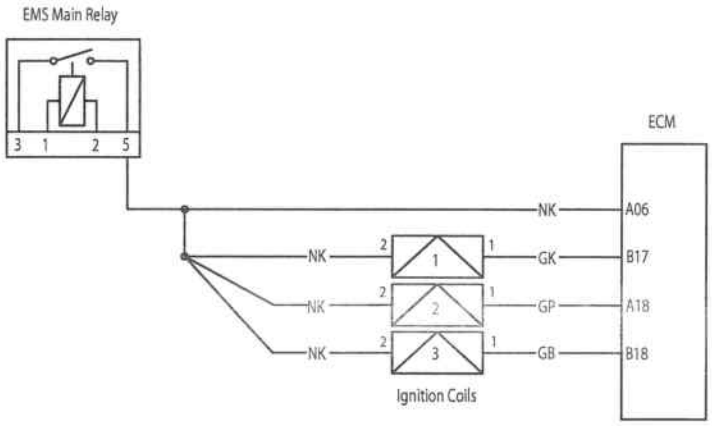
Ignition Coils

Fault Code	Possible cause	Action
P0351/52/53	Ignition system fault - Ign coil 1/2/3	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:	OK	Proceed to test 2
	- ECM pin B17 - ECM pin A18 - ECM pin B18	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 - ECM pin (ign coil 3) B18	0.8Ω to 1.2Ω	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:	OK	Proceed to test 7
	- ECM pin to earth B17 - ECM pin to earth A18 - ECM pin to earth B18	Short circuit	Locate and rectify wiring fault, proceed to test 7
4	Check cable continuity:	OK	Proceed to test 6
	EMS main relay pin 5 to any ign coil pin 2 - ECM pin B17 to ign coil 1 pin 1 - ECM pin A18 to ign coil 2 pin 1 - ECM pin B18 to ign coil 3 pin 1	Open circuit	Locate and rectify wiring fault, proceed to test 7
5	Check cable for short circuit:	OK	Proceed to test 6
	ECM pin A06 to - ECM pin (ign coil 1) B19 - ECM pin (ign coil 2) A18 - ECM pin (ign coil 3) B18	Short circuit	Locate and rectify wiring fault, proceed to test 7
6	Check relevant ign coil resistance:	0.8Ω to 1.2Ω	Proceed to test 7
	- Ign coil pin 1 to ign coil pin 2	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

Circuit Diagram



Coolant 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:

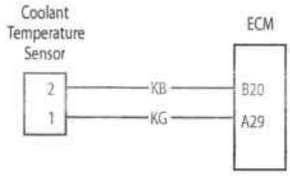
Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity:	OK	Proceed to test 2
- ECM pin A29 - ECM pin B20	Faulty	Rectify fault, proceed to test 7
2 Check resistance value:	OK	Disconnect temp sensor and proceed to test 6
- ECM pin A29 to ECM pin B20 (Temperature dependent - see below)	Open circuit	Disconnect sensor and proceed to test 3
	Short circuit	Disconnect temp sensor and proceed to test 4
3 Check cable continuity:	OK	Proceed to test 5
- ECM pin A29 to sensor pin 1 - ECM pin B20 to sensor pin 2	Open circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable for short circuit:	OK	Proceed to test 5
- ECM pin A29 to ECM pin B20	Short circuit	Locate and rectify wiring fault, proceed to test 7
5 Check sensor resistance:	OK	Proceed to test 7
- Sensor pin 1 to sensor pin 2 (Temperature dependent - see below)	Faulty	Renew temp sensor, proceed to test 7
6 Check cable for short circuit:	OK	Proceed to test 7
- ECM pin A29 to ground	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

Circuit Diagram

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



Intake 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

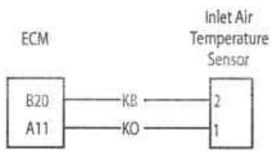
Test	Result	Action
1 Check cable and terminal integrity:	OK	Proceed to test 2
- ECM pin A11 - ECM pin B20	Faulty	Rectify fault, proceed to test 7
2 Check resistance value: - ECM pin A11 to ECM pin B20	OK	Disconnect temp sensor and proceed to test 6
(Temperature dependent - see below)	Open circuit	Disconnect temp sensor and proceed to test 3
	Short circuit	Disconnect temp sensor and proceed to test 4
3 Check cable continuity:	OK	Proceed to test 5
- ECM pin A11 to sensor pin 1 - ECM pin B20 to sensor pin 2	Open circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable for short circuit:	OK	Proceed to test 5
- ECM pin A11 to ECM pin B20	Short circuit	Locate and rectify wiring fault, proceed to test 7
5 Check sensor resistance:	OK	Proceed to test 7
- Sensor pin 1 to sensor pin 2 (Temperature dependent - see below)	Faulty	Renew temp sensor, proceed to test 7
6 Check cable for short circuit:	OK	Proceed to test 7
- ECM pin A11 to ground	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

Circuit Diagram

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

Resistance data:

Ambient temp	Resistance value
80°C	200 to 400Ω
20°C	2.35 to 2.65KΩ
-10°C	8.50 to 10.25KΩ



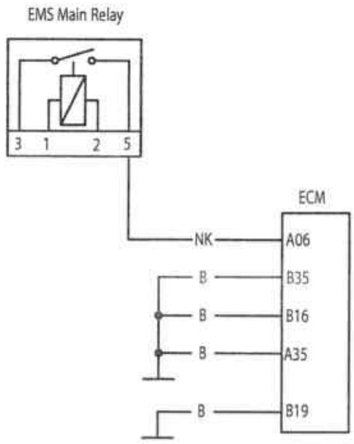
System Voltage

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

Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity:	OK	Proceed to test 2
	- ECM pin A06	Faulty	Rectify fault, proceed to test 3
2	With Ignition 'ON', check voltage at:	Same as 'across battery' voltage	Proceed to test 3
	- ECM pin A06	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



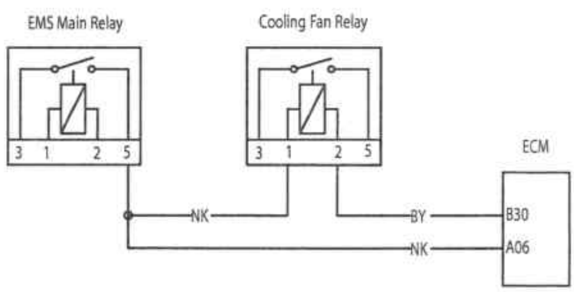
Cooling Fan Relay

Fault Code	Possible cause	Action
P1552	Fan relay open circuit, or short circuit to ground	View & note diagnostic tool 'sensor' data. Ensure fan relay connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1553	Short circuit to battery+	Disconnect fan relay and proceed to pinpoint test 4:

Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity:	OK	Disconnect fan relay and proceed to test 2
	- ECM pin B30	Faulty	Rectify fault, proceed to test 5
2	Check cable for short circuit:	OK	Proceed to test 3
	- ECM pin B30 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 5
3	Check cable continuity:	OK	Proceed to test 4
	- Fan relay pin 2 to ECM pin B30 - Fan relay pin 1 to EMS main relay pin 5	Open circuit	Locate and rectify wiring fault, proceed to test 5
4	Check cable for short circuit:	OK	Proceed to test 5
	- ECM pin B30 to ECM pin A06	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 cooling fan	OK	Action complete - quit test
		Fault still present	Contact Triumph service

Circuit Diagram



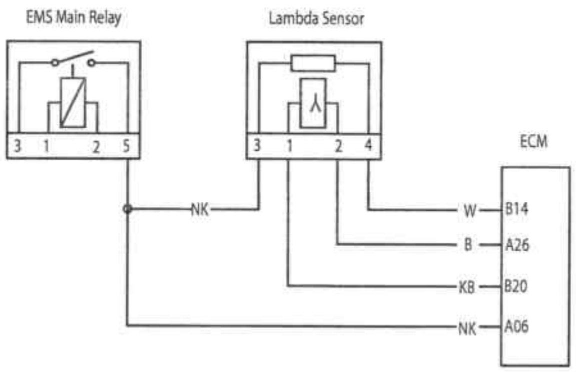
Lambda Sensor

Fault Code	Possible cause	Action
P0130	Lambda sensor circuit fault.	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 B20	OK	Disconnect Lambda sensor and proceed to test 2
		Faulty	Rectify fault, proceed to test 4
2	Check cable for short circuit: - ECM pin A26 to ECM pin B20 - ECM pin A26 to ECM pin A06	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 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	Reconnect harness, clear fault code and run engine. Check adaptation status	OK	Action complete - quit test
		Fault still present	Contact Triumph service

Circuit Diagram



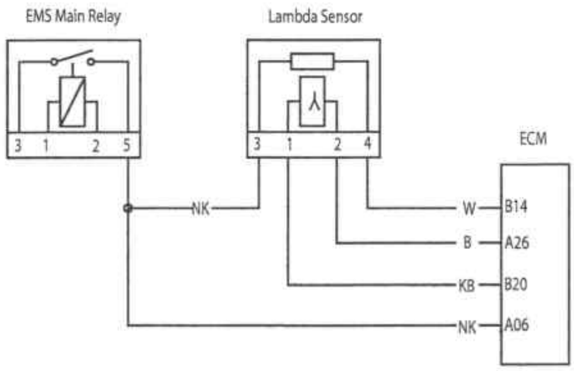
Lambda Sensor Heater

Fault Code	Possible cause	Action
P0031	Lambda sensor heater circuit short circuit to ground or open circuit.	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	Lambda sensor heater circuit, short circuit to battery.	Disconnect lambda sensor and proceed to pinpoint test 4:

Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity: - ECM pin B14	OK	Disconnect Lambda sensor and proceed to test 2
		Faulty	Rectify fault, proceed to test 5
2	Check cable for short circuit:	OK	Proceed to test 3
	- ECM pin B14 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 5
3	Check cable continuity:	OK	Proceed to test 5
	- ECM pin B14 to sensor pin 4 - ECM pin A06 to sensor pin 3	Open circuit	Locate and rectify wiring fault, proceed to test 5
4	Check cable for short circuit: - ECM pin B14 to ECM pin A06	OK	Renew Lambda 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. Check adaption status	OK	Action complete, quit test
		Fault still present	Contact Triumph service

Circuit Diagram



EEPROM Error

Fault Code	Possible cause	Action
P0603	EEPROM error	View & note "freeze frame" data if available. No tests available - contact Triumph service.

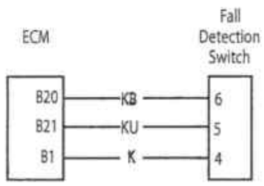
Fall Detection Switch

Fault Code	Possible cause	Action
P1631 P1632	Fall detection switch low input voltage Fall detection switch high input voltage or open circuit	View & note "freeze frame" data if available. 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:	OK	Disconnect sensor and proceed to test 2
- ECM pin B21	Faulty	Rectify fault, proceed to test 6
2 Check cable for short circuit:	OK	Proceed to test 3
- ECM pin A04 to ground - ECM pin B21 to ECM pin B01 - ECM pin B21 to ECM pin B20	Short circuit	Locate and rectify wiring fault, proceed to test 6
3 Check cable continuity:	OK	Proceed to test 4
- ECM pin B01 to sensor pin 4 - ECM pin B21 to sensor pin 5 - ECM pin B20 to sensor pin 6	Open circuit	Locate and rectify wiring fault, proceed to test 6
4 Check cable for short circuit:	OK	Proceed to test 5
- Sensor pin 4 to sensor pin 5 - Sensor pin 4 to sensor pin 6	Short circuit	Locate and rectify wiring fault, proceed to test 6
5 Check voltage (with ignition 'ON'):	5V	Renew fall detection switch and proceed to test 6
- Sensor pin 4	Less than 4.8V	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



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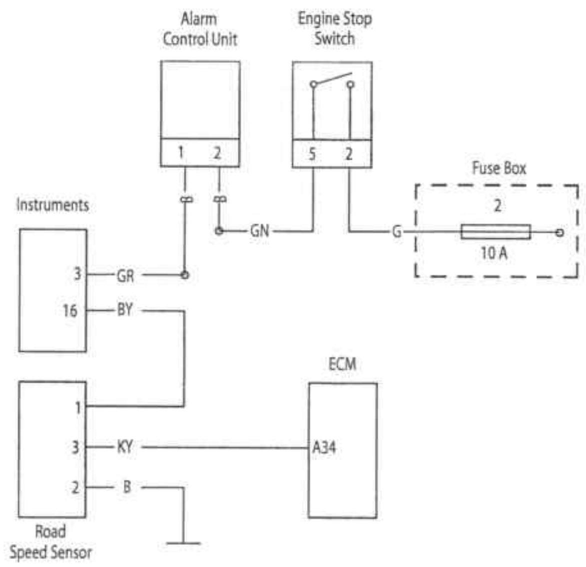
Vehicle Speed Sensor

Fault Code	Possible cause	Action
P0500	Vehicle speed sensor circuit fault	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:	OK	Disconnect ambient pressure sensor and proceed to test 2
	- ECM pin A34 - Instrument pin 16	Faulty	Rectify fault, proceed to test 4
2	Check cable for short circuit:	OK	Proceed to test 3
	- ECM pin A34 to ground - ECM pin A34 to Instruments pin 16	Faulty	Locate and rectify wiring fault, proceed to test 4
3	Check cable for continuity:	OK	Renew vehicle speed sensor and proceed to test 4
	- ECM pin A34 to sensor pin 3 - Sensor pin 2 to ground - Instruments pin 16 to sensor pin 1	Open circuit	Locate and rectify wiring 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



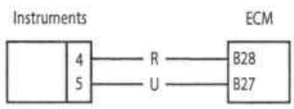
Instrument Communication (CAN)

Fault Code	Possible cause	Action
P1690	Fault in CAN communication between ECM and Instrument pack.	View & note "freeze frame" data if available. View & note "sensor" data. Ensure Instrument connector is secure. Disconnect ECM and proceed to pinpoint test 1:

Pinpoint Tests

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

Circuit Diagram



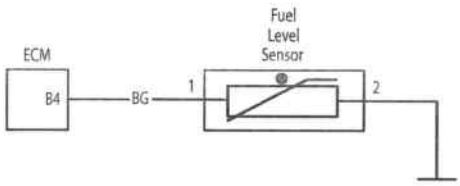
Fuel Level Sensor

Fault Code	Possible cause	Action
P0460	Fuel level sensor circuit fault	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:	OK	Disconnect sensor and proceed to test 2
	- ECM pin B04	Faulty	Rectify fault, proceed to test 5
2	Check cable for short circuit:	OK	Proceed to test 3
	- ECM pin B04 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 5
3	Check cable continuity:	OK	Proceed to test 4
	- ECM pin B04 to sensor pin 1 - Sensor pin 2 to ground	Open circuit	Locate and rectify wiring fault, proceed to test 5
4	Check cable for short circuit:	OK	Renew fuel level sensor and proceed to test 5
	- Sensor pin 1 to sensor pin 2	Short circuit	Locate and rectify wiring fault, proceed to test 5
5	Reconnect harness, clear fault code	OK	Action complete, quit test
		Fault still present	Contact Triumph service

Circuit Diagram



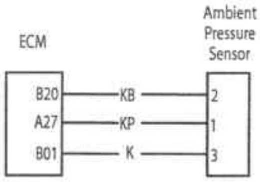
Ambient (Barometric) Pressure Sensor

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 B07	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



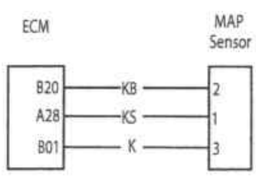
Manifold Absolute Pressure (Map) Sensor

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.

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity:	OK	Disconnect MAP sensor and proceed to test 2
- ECM pin A28 - ECM pin B20 - ECM pin B01	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit:	OK	Proceed to test 3
- ECM pin A28 to ECM B20	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable for continuity:	OK	Renew MAP sensor and proceed to test 5
- ECM pin A28 to sensor pin 1 - ECM pin B20 to sensor pin 2 - ECM pin B01 to sensor pin 3	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin A28 to ECM pin A01	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



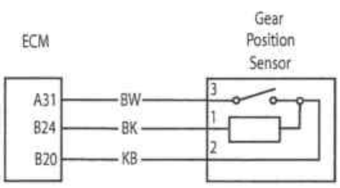
Gear Position Sensor

Fault Code	Possible cause	Action
P0705	Gear position sensor circuit fault	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:	OK	Disconnect sensor and proceed to test 2
	- ECM pin B24	Faulty	Rectify fault, proceed to test 5
2	Check cable for short circuit:	OK	Proceed to test 3
	- ECM pin B24 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 5
3	Check cable for continuity:	OK	Proceed to test 4
	- ECM pin B24 to sensor pin 1 - ECM pin B20 to sensor pin 2 - ECM pin A31 to sensor pin 3	Open circuit	Locate and rectify wiring fault, proceed to test 5
4	Check cable for short circuit: - Sensor pin 1 to sensor pin 2 - Sensor pin 1 to sensor pin 3	OK	Renew gear position sensor and contact pin and proceed to test 5
		Short circuit	Locate and rectify wiring fault, proceed to test 5
5	Reconnect harness, clear fault code	OK	Action complete, quit test
		Fault still present	Contact Triumph service

Circuit Diagram



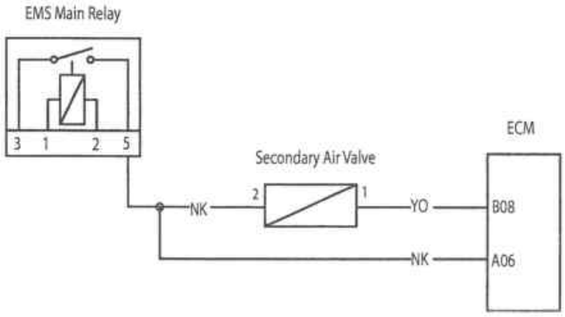
Secondary Air Injection Valve

Fault Code	Possible cause	Action
P0413	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:	OK	Proceed to test 2
- ECM pin B08	Faulty	Rectify fault, proceed to test 7
2 Check resistance value:	20Ω to 25Ω	Disconnect SAI valve and proceed to test 3
- ECM pin B08 to ECM pin A06	Open circuit	Proceed to test 4
	Short circuit	Disconnect SAI valve and proceed to test 5
3 Check cable for short circuit:	OK	Proceed to test 6
- ECM pin B08 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 7
4 Check cable continuity:	OK	Proceed to test 6
- ECM pin B08 to valve pin 1 - ECM pin A06 to valve pin 2	Open circuit	Locate and rectify wiring fault, proceed to test 7
5 Check cable for short circuit:	OK	Proceed to test 6
- ECM pin B08 to ECM pin A06	Short circuit	Locate and rectify wiring fault, proceed to test 7
6 Check SAI valve resistance:	20Ω to 25Ω	Proceed to test 7
- Valve pin 1 to Valve pin 2	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



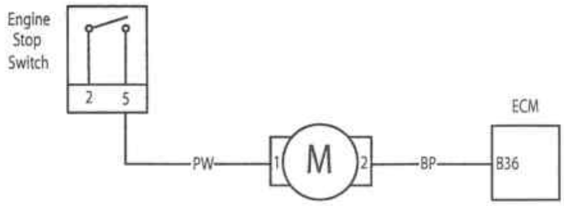
Fuel Pump

Fault Code	Possible cause	Action
P1628	Open circuit or short circuit to earth	View & note diagnostic tool 'sensor' data. Ensure fuel pump connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1629	Short circuit to battery positive	Disconnect fuel pump and proceed to pinpoint test 5:

Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity:	OK	Proceed to test 2
	- ECM pin B36	Faulty	Rectify fault, proceed to test 7
2	Check resistance value: - ECM pin B36 to fuse box Fuse 2, note that the engine stop switch must in the 'RUN' position and any alarm fitted must be disarmed	2Ω to 6Ω	Disconnect fuel pump and proceed to test 3
		Open circuit	Proceed to test 4
		Short circuit	Disconnect fuel pump and proceed to test 5
3	Check cable for short circuit:	OK	Proceed to test 6
	- ECM pin B36 to earth	Short circuit	Locate and rectify wiring fault, proceed to test 7
4	Check cable continuity:	OK	Proceed to test 6
	- ECM pin B36 to Pump pin 2 - Fuse box fuse 2 to fuel pump pin 1, note that the engine stop switch must in the 'RUN' position and any alarm fitted must be disarmed	Open circuit	Locate and rectify wiring fault, proceed to test 7
5	Check cable for short circuit:	OK	Proceed to test 6
	- ECM pin B36 to fuse box Fuse 2, note that the engine stop switch must in the 'RUN' position and any alarm fitted must be disarmed	Faulty	Locate and rectify wiring fault, proceed to test 7
6	Check fuel pump resistance:	2Ω to 6Ω	Proceed to test 7
	- Pump pin 1 to pump pin 2	Faulty	Renew fuel pump module, proceed to test 7
7	Reconnect harness, clear fault code and run diagnostic tool function test to verify operation of fuel pump	OK	Action complete - quit test
		Fault still present	Contact Triumph service

Circuit Diagram



Intake Air Flap Solenoid

Fault Code	Possible cause	Action
P1670	Open circuit or short circuit to earth	View & note diagnostic tool 'sensor' data. Ensure intake flap solenoid connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1671	Short circuit to battery positive	Disconnect Intake Flap Actuator and proceed to pinpoint test 5:

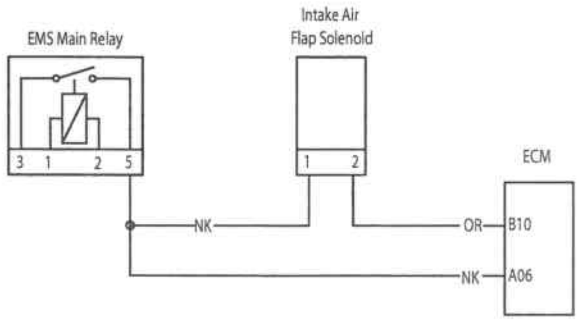
Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity:	OK	Proceed to test 2
	- ECM pin B10	Faulty	Rectify fault, proceed to test 7
2	Check resistance value: - ECM pin B10 to ECM pin A06	40Ω to 50Ω	Disconnect intake flap solenoid and proceed to test 3
		Open circuit	Proceed to test 4
		Short circuit	Disconnect intake flap solenoid and proceed to test 5
3	Check cable for short circuit:	OK	Proceed to test 6
	- ECM pin B10 to earth	Short circuit	Locate and rectify wiring fault, proceed to test 7
4	Check cable continuity:	OK	Proceed to test 6
	- ECM pin B10 to Actuator pin 2 - ECM pin A06 to Actuator pin 1	Open circuit	Locate and rectify wiring fault, proceed to test 7
5	Check cable for short circuit:	OK	Proceed to test 6
	- ECM pin B10 to ECM pin A06	Faulty	Locate and rectify wiring fault, proceed to test 7
6	Check Intake Air Flap Solenoid resistance:	40Ω to 50Ω	Proceed to test 7
	- Solenoid pin 1 to Actuator pin 2	Faulty	Renew intake flap solenoid, proceed to test 7
7	Reconnect harness, clear fault code and run engine to visually verify operation of Intake Flap Actuator (see below)	OK	Action complete - quit test
		Fault still present	Contact Triumph service

Note:

- **To verify the correct operation of the air intake flap, start the engine and briefly raise the engine speed above 4500 rpm. The flap should be seen to open as the engine speed rises and close again as the engine speed falls.**

Circuit Diagram



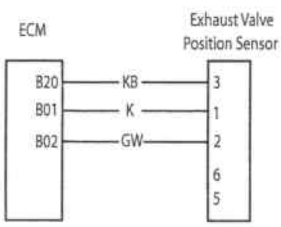
Exhaust Butterfly Valve (EXBV) Position Sensor

Fault Code	Possible cause	Action
P1078	Exhaust butterfly valve position sensor low input voltage (short to ground or open circuit)	View & note diagnostic tool 'freeze frame' data if available. View & note diagnostic tool 'sensor' data. Ensure actuator connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1079	Exhaust butterfly valve position sensor high input voltage (short circuit to sensor supply)	

Pinpoint Tests

Test	Result	Action
1 Check cable and terminal integrity: - ECM pin B02 - ECM pin B01 - ECM pin B20	OK	Disconnect Actuator and proceed to test 2
	Faulty	Rectify fault, proceed to test 5
2 Check cable for short circuit: - ECM pin B02 to ground	OK	Proceed to test 3
	Short circuit	Locate and rectify wiring fault, proceed to test 5
3 Check cable continuity: - ECM pin B02 to Actuator pin 2 - ECM pin B01 to Actuator pin 1 - ECM pin B20 to Actuator pin 3	OK	Proceed to test 4
	Open circuit	Locate and rectify wiring fault, proceed to test 5
4 Check cable for short circuit: - ECM pin B02 to ECM pin B01 - ECM pin B02 to ECM pin B20	OK	Renew exhaust control valve actuator, 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 the Exhaust control valve actuator	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



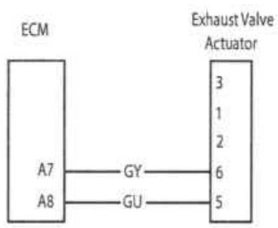
Exhaust Butterfly Valve (EXBV) Motor

Fault Code	Possible cause	Action
P0078	Exhaust butterfly valve motor circuit fault	View & note diagnostic tool 'freeze frame' data if available. View & note diagnostic tool 'sensor' data. Ensure actuator connector is secure. Disconnect ECM and proceed to pinpoint test 1:
P1080	Cable or Mechanism fault	Proceed to pinpoint test 5:

Pinpoint Tests

	Test	Result	Action
1	Check cable and terminal integrity:	OK	Disconnect actuator and proceed to test 2
	- ECM pin A07 - ECM pin A08	Faulty	Rectify fault, proceed to test 6
2	Check cable for short circuit: - ECM pin A07 to ground - ECM pin A08 to ground	OK	Proceed to test 3
		Short circuit	Locate and rectify wiring fault, proceed to test 6
3	Check cable continuity:	OK	Proceed to test 4
	- ECM pin A07 to Actuator pin 6 - ECM pin A08 to Actuator pin 5	Open circuit	Locate and rectify wiring fault, proceed to test 6
4	Check cable for short circuit:	OK	Renew exhaust control valve actuator, proceed to test 6
	- ECM pin A07 to ECM pin A08	Short circuit	Locate and rectify wiring fault, proceed to test 6
5	Check adjustment of cables is within specification. Disconnect cables and check that the cables are free to slide through the cable outers (see page *10-137*)	OK	Renew Exhaust control valve actuator, proceed to test 6
	Using a suitable tool check that the exhaust control valve can be rotated manually	Faulty	Renew relevant part and proceed to test 6
6	Reconnect harness, clear fault code and run diagnostic tool function test to visually verify operation of the exhaust control valve actuator	OK	Action complete - quit test
		Fault still present	Contact Triumph service

Circuit Diagram



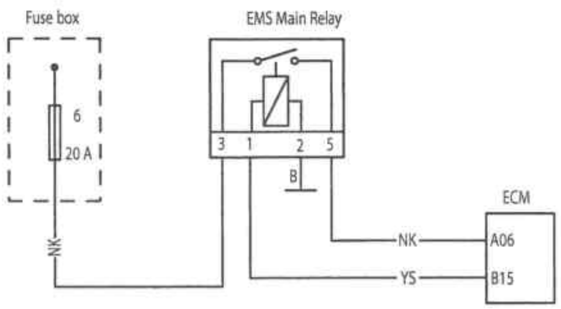
EMS Main Relay Circuit

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.	OK	Proceed to test 2
	Check that relay operates when the ignition is switched ON.	Faulty	Disconnect ECM and proceed to test 4
2	Check fuse box Fuse 6 integrity	OK	Disconnect ECM and proceed to test 4
		Faulty	Disconnect ECM and proceed to test 3
3	Check cable for short circuit:	OK	Replace Fuse 6 and proceed to test 4
	- ECM pin A06 to ground - EMS Main relay pin 3 to ground	Short circuit	Locate and rectify wiring fault, replace Fuse 6 and proceed to test 7
4	Check cable and terminal integrity:	OK	Disconnect Main Relay and proceed to test 5
	- 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	Faulty	Rectify fault, proceed to test 7
5	Check cable for short circuit:	OK	Proceed to test 6
	- ECM pin B15 to ground	Short circuit	Locate and rectify wiring fault, proceed to test 7
6	Check cable continuity:	OK	Replace EMS Main Relay and proceed to test 7
	- 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 6	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

Circuit Diagram



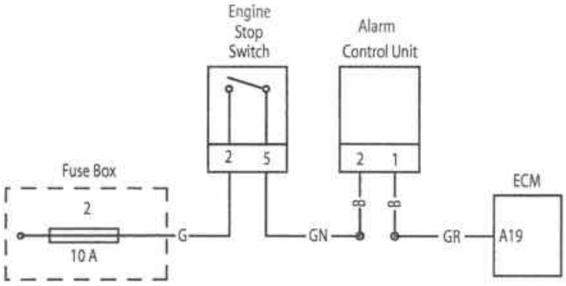
EMS Ignition Voltage Input Circuit

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 2 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 2 and proceed to test 3
		Short circuit	Locate and rectify wiring fault, replace Fuse 2 and proceed to test 5
3	Check cable and terminal integrity:	OK	Proceed to test 4
	- ECM pin A19 - Alarm Connector pin 1 - Alarm Connector pin 2 - Right hand switchcube pin 2 - Right hand switchcube pin 5	Faulty	Rectify fault, proceed to test 5
4	Check cable continuity:	OK	Proceed to test 5
	- ECM pin A19 to fuse box Fuse 2, note that the engine stop switch must be in the 'RUN' position and any Alarm fitted must be disarmed	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



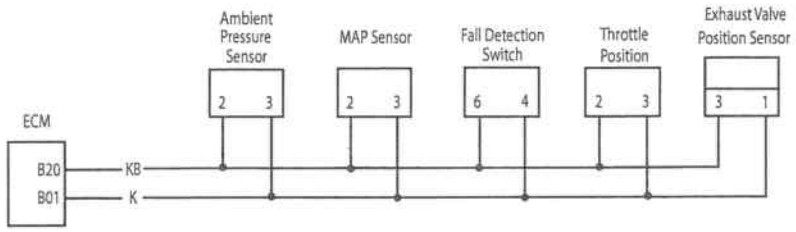
5 Volt Sensor Supply Circuit

Fault Code	Possible cause	Action
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:	OK	Proceed to test 2
- ECM pin B01 - ECM pin B20	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:	OK	Replace sensor last removed and proceed to test 5
- MAP sensor - Ambient pressure sensor - Throttle position switch - Exhaust control valve actuator -Fall detection sensor and retest for short circuit - ECM pin B01 to ECM pin B20	Faulty	Proceed to test 4
4 Check cable for short circuit:	OK	Proceed to test 5
- 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	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 5V sensor supply voltage level	OK	Action complete - quit test
	Fault still present	Contact Triumph service

Circuit Diagram



Tune Lock

Fault Code	Possible cause	Action
P1602	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

ECM or Tune ID Incorrect

Fault Code	Possible cause	Action
P1614	ECM or Tune is incorrect, causing the ECM to be disabled to prevent the motorcycle from being operated.	This is also identified by a fast flashing MIL indication, and a disabled engine management system.

Pinpoint Tests

	Test	Result	Action
1	Check ECM part number is correct for the motorcycle	OK	Proceed to test 2
		Incorrect	Replace ECM with correct part and proceed to test 3
2	Check that the tune is correct for the motorcycle, using the diagnostic tool	OK	Proceed to test 3
		Incorrect	Update tune using service tool, proceed to test 3
4	Clear fault code, check for normal operation	OK	Action complete - quit test
		Fault still present	Contact 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
	ISC (Idle Speed Control) actuator inoperative
	Low fuel pressure
	Weak mixture caused by air leak at the throttle body/ transition piece to cylinder head face
Idle speed too low/high	ISC (Idle Speed Control) actuator sticking
	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	ISC motor stuck
	Low fuel pressure caused by filter blockage/leaks
Abnormally high fuel pressure	Fuel pressure regulator inoperative
Temperature gauge reads cooler than normal	Cooling system air–locked resulting in coolant temperature sensor operating in air instead of coolant
Intake air flap inoperative	Vacuum leak to actuator, vacuum reservoir or hoses

Fuel Tank

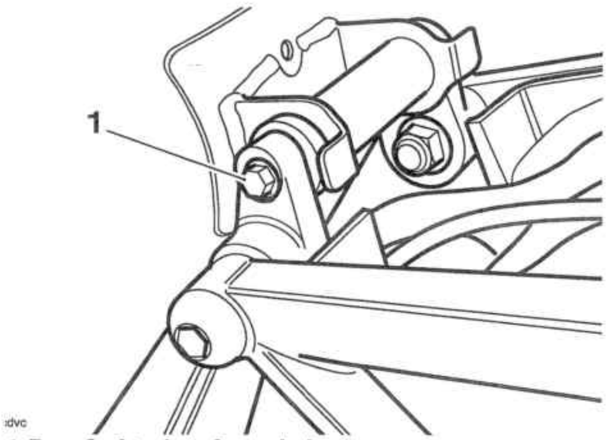
Removal

Warning

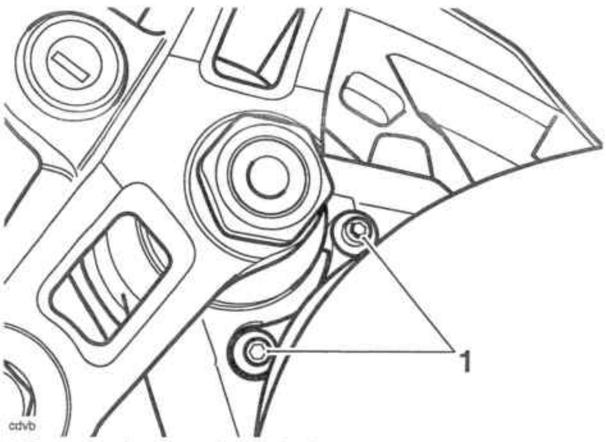
Observe the warning advice given in the general information section on the safe handling of fuel and fuel containers.

A fire, causing personal injury and damage to property, could result from spilled fuel or fuel not handled or stored correctly.

1. Remove the rider's seat (see page 16-11).
2. Disconnect the battery, negative (black) lead first.
3. Release the bolts securing the fuel tank to the frame.

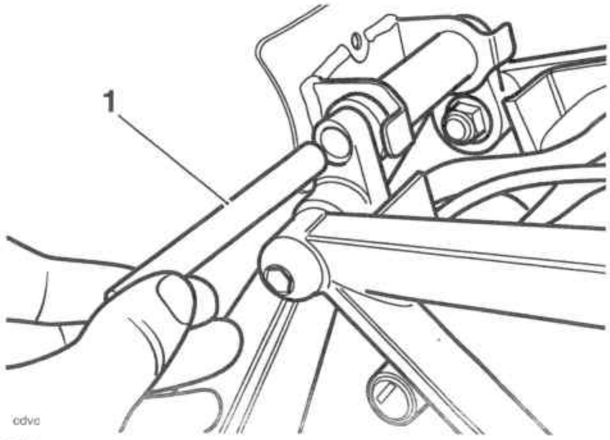


1. Rear fuel tank to frame bolt



1. Front fuel tank to frame bolts

4. Withdraw the spacer sleeve from the frame.



1. Spacer sleeve

5. Raise the fuel tank and disconnect the electrical connections to the fuel pump and the 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.

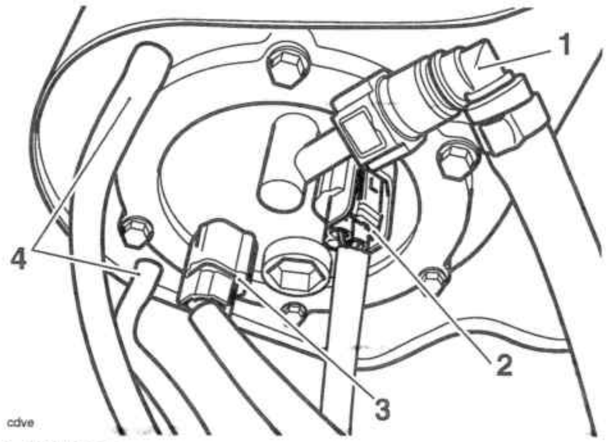
This would represent a serious fire hazard which could lead to burn injuries and damage to property.

6. Disconnect the fuel hose by squeezing the sides of the connector and pulling the hose free from its spigot on the fuel pump plate.

Note:

- **Before disconnection, note the position of the two breather hoses so that they can be returned to the same locations when refitting the tank.**

7. Disconnect the two breather hoses.

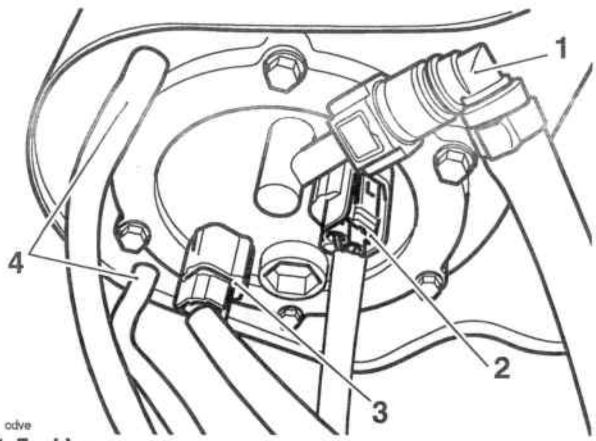


1. Fuel hose
2. Fuel pump electrical connection
3. Low fuel level sensor connection
4. Breather hose

8. Remove the fuel tank from the frame.

Installation

1. Position the fuel tank to the frame.
2. Connect the two breather hoses as previously noted.
3. Reconnect the fuel feed hose by gently pushing inwards until the hose engages with a click.
4. Reconnect the fuel pump electrical connection.
5. Reconnect the low fuel level sensor.



1. Fuel hose
2. Fuel pump electrical connection
3. Low fuel level sensor connection
4. Breather hoses

6. Align the fuel tank to the mounting points. Refit the rear spacer sleeve. Fit and tighten the three bolts to **9 Nm**.
7. Reconnect the battery, positive (red) lead first.
8. Start the engine and check carefully for fuel leaks. Rectify as necessary.
9. Refit the rider's seat (see page *16-11*).

Fuel Pump, Fuel Filter and Low Fuel Level Sensor

Removal

Note:

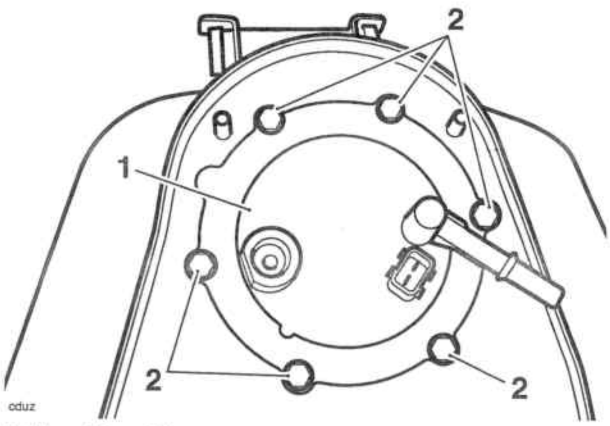
- **The fuel pump, fuel filter and low fuel level sensor assembly is a sealed for life unit and must be replaced as a complete assembly.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
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.

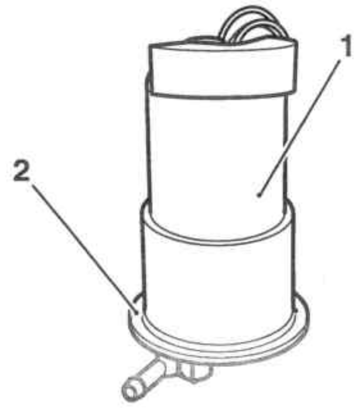
5. Invert the fuel tank and place on a protective surface to prevent paint damage.
6. Remove the fixings securing the fuel pump mounting plate to the tank.



1. Mounting plate
2. Mounting plate fixings

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

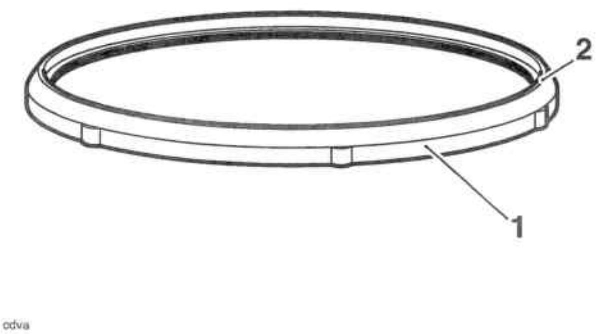
8. Noting its orientation, remove and discard the sealing ring from the fuel pump assembly.



1. Fuel pump assembly
2. Sealing ring location

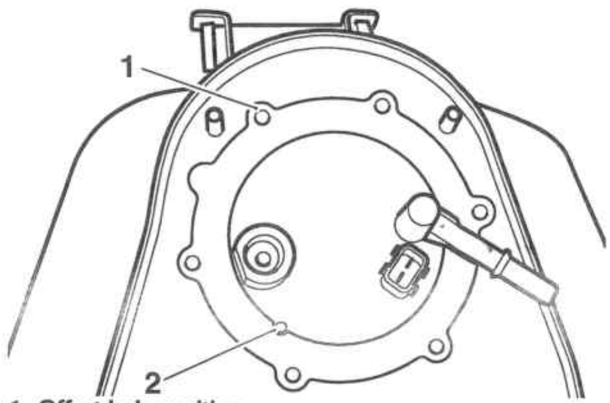
Installation

1. Install a new sealing ring in the fuel pump assembly, with the seal lip facing uppermost, and ensure that it is correctly seated.



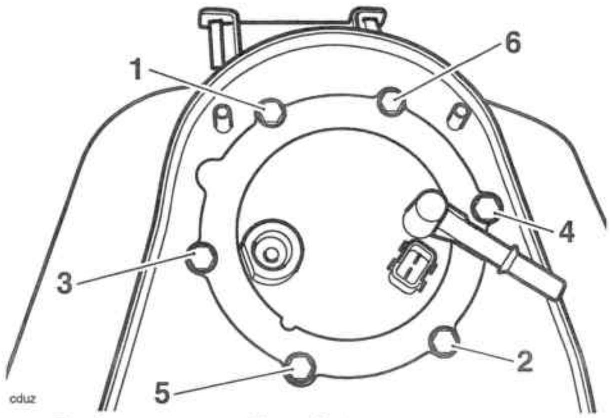
1. Sealing ring
2. Seal lip

2. Taking care to ensure the sealing ring is not damaged or dislodged, manoeuvre the fuel pump assembly into the tank aperture.
3. Ensure the locating peg on the fuel pump assembly is located in the cut out on the mounting plate and the offset hole is positioned as shown below.



1. Offset hole position
2. Locating peg

4. In the sequence shown below, tighten the mounting plate fixings to **9 Nm**.



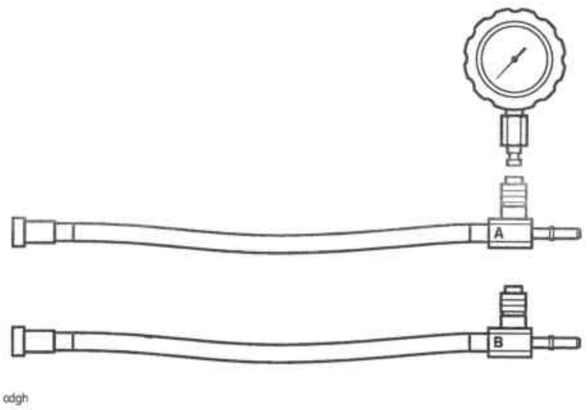
Fuel pump mounting plate torque sequence

5. Refit the fuel tank (see page *10-106*).
6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (see page *16-11*).

Fuel Pressure Checking

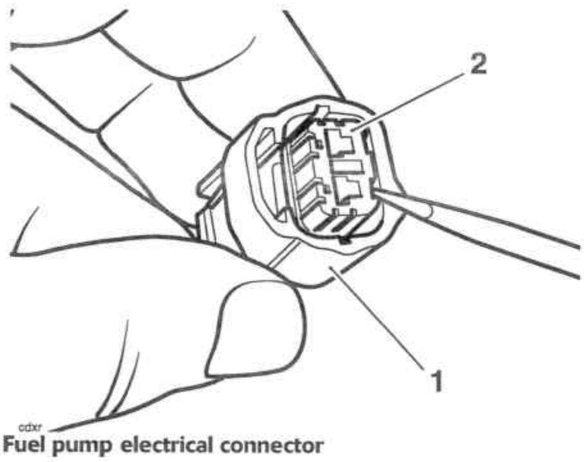
> **Warning**
>
> Observe the fuel handling precautions given in the general information system.

Fuel pressure is checked using service tool T3880001.



Tool T3880001

1. Remove the rider's seat (see page *16-11*).
2. Remove the fuel tank (see page *10-105*) and place on a suitable support, close to the motorcycle.
3. Using a suitable tool, carefully remove the insert from the fuel pump electrical connector on the main harness. DO NOT discard the insert, as this will be refitted at the end of the procedure.



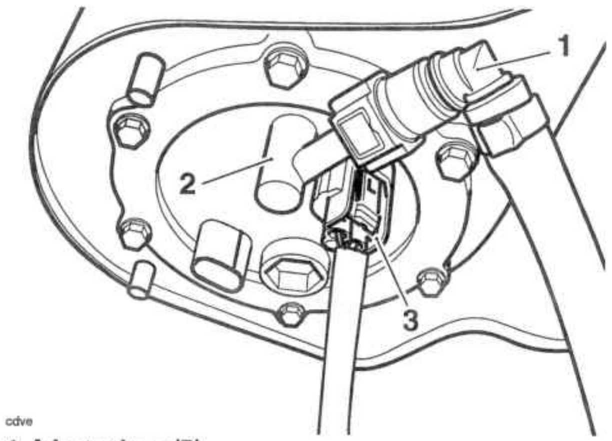
1. Fuel pump electrical connector
2. Connector insert

> **Caution**
>
> Ensure the connector terminals of the main harness, fuel pump assembly or extension cable T3880123 are not bent or damaged when connecting or disconnecting the extension cable to or from the motorcycle.

4. Using the extension cable T3880123, carefully connect the fuel pump connection on the main harness to the fuel tank. Connect the other end of the extension cable to the motorcycle main harness.
5. Select the fuel pressure gauge adapter marked 'B' from service tool T3880001.

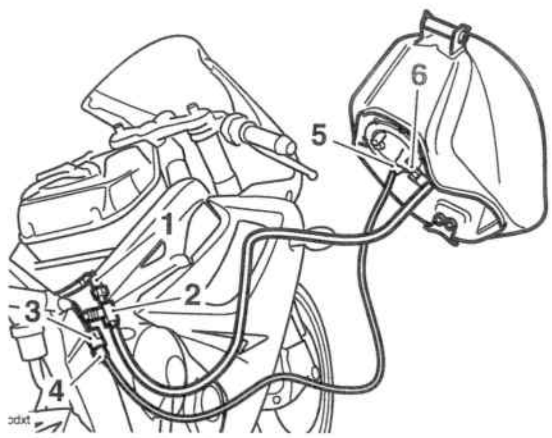
> **Warning**
>
> Always us the correct fuel pressure gauge adapter (adapter 'B' for Daytona 675). Use of an incorrect adapter will result in a fuel leak. A fuel leak can result in a fire causing damage to property and injury to persons.

6. Connect the adapter hose to the fuel pump plate outlet as shown in the illustration below.



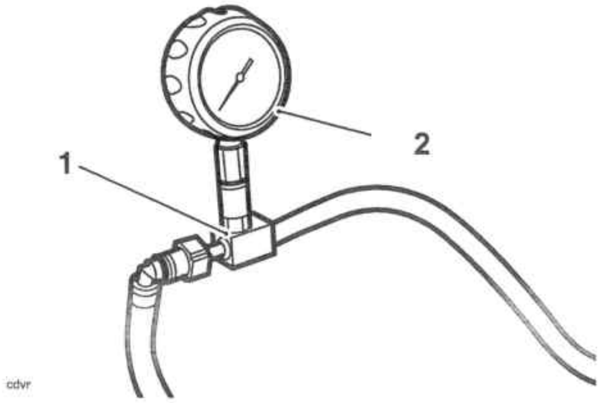
1. Adaptor hose 'B'
2. Fuel pump plate outlet
3. Extension cable T3880123

7. Connect the fuel hose to the adaptor hose as shown in the illustration below.



1. Motorcycle fuel hose
2. Adaptor hose 'B'
3. Fuel pump connection
4. Wiring extension T3880123
5. Fuel pump connection
6. Fuel pump plate outlet

8. Connect the fuel pressure gauge to the adaptor hose as shown below by pushing the gauge spigot in to adapter until a click can be heard.



1. Adaptor hose
2. Fuel pressure gauge

Note:

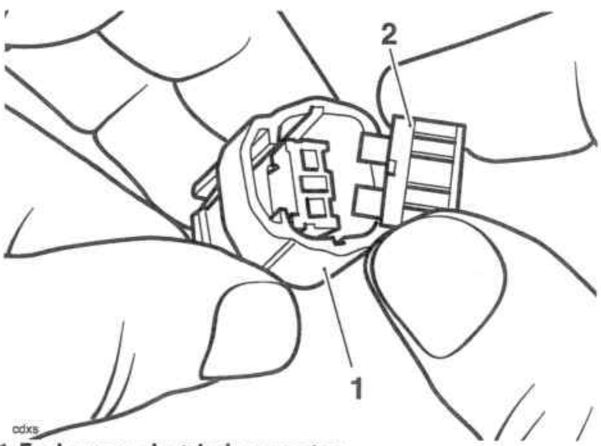
- **To release the fuel pressure gauge from the adapter, slide the outer ferrule downwards. This will allow the gauge to spring upwards from the adapter.**

9. Ensure the gauge is visible to the side of the motorcycle.
10. Start the engine and observe the fuel pressure reading on the gauge.

Note:

- **The fuel pressure should be 3.0 bar nominally.**

11. When fuel pressure checking is complete, disconnect the fuel pressure gauge adapter and wiring extension.
12. Refit the insert to the fuel pump electrical connector on the main harness



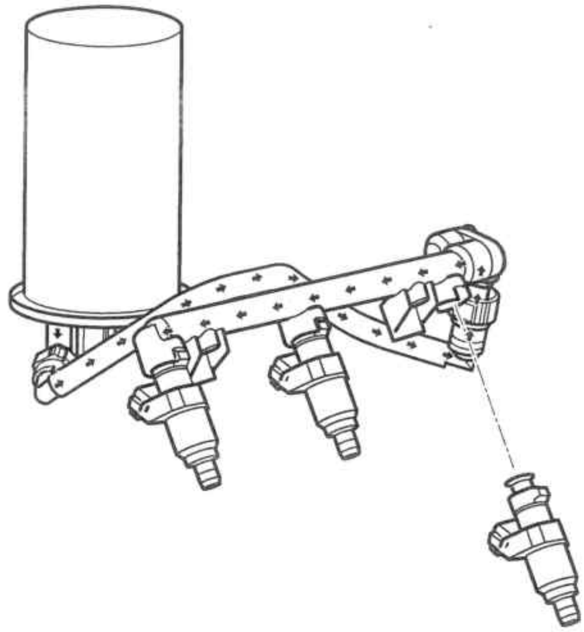
1. Fuel pump electrical connector
2. Connector insert

13. Refit the fuel tank (see page *10-106*).

Fuel Delivery System

Fuel is delivered to the injectors by a pump located inside the fuel tank. Fuel flows in the direction of the arrows shown in the diagram below.

Incorporated in the fuel pump assembly is a filter, a pressure regulator and a pick-up strainer. The fuel pump assembly also contains the low fuel level sensor.

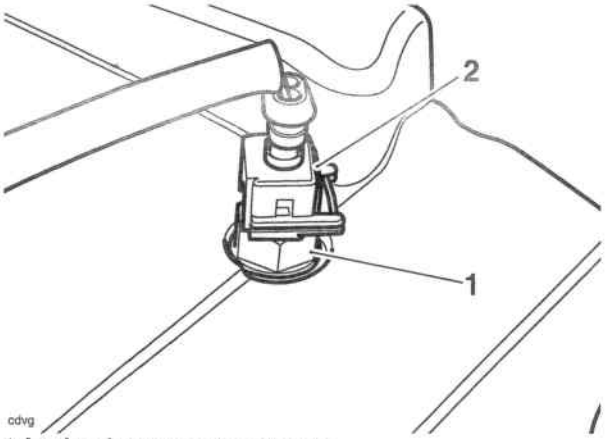


Direction of Fuel Flow

Airbox

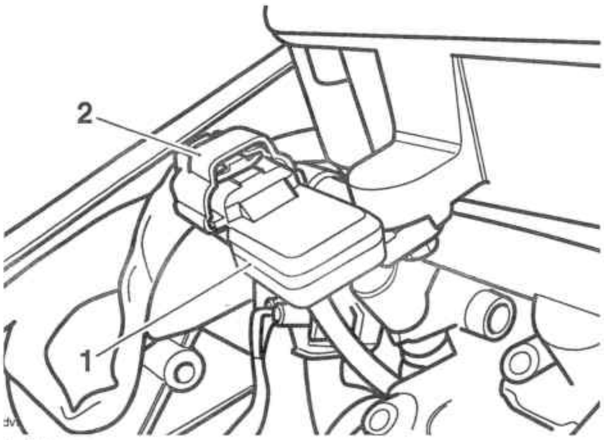
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-106*).
4. Disconnect the ECM connectors (see page *10-61*).
5. Disconnect the intake air temperature sensor multi-plug.



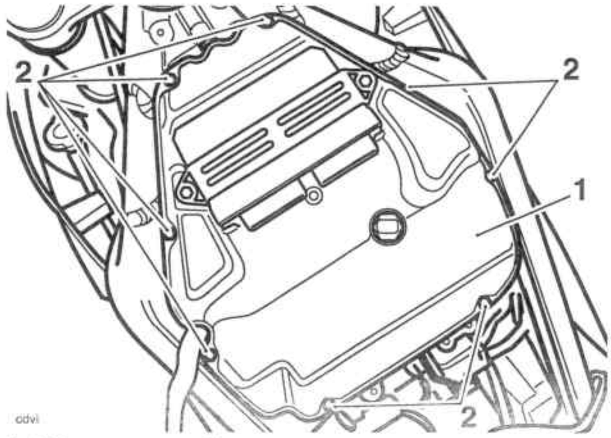
1. Intake air temperature sensor
2. Multi-plug

6. Disconnect the map sensor multi-plug.



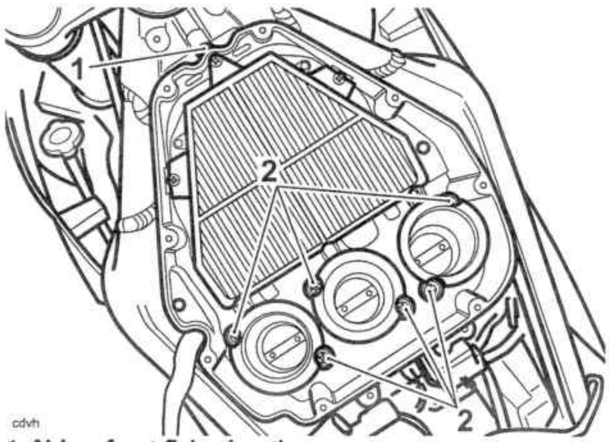
1. Map sensor
2. Multi-plug

7. Release the eight fixings and remove the airbox upper section.



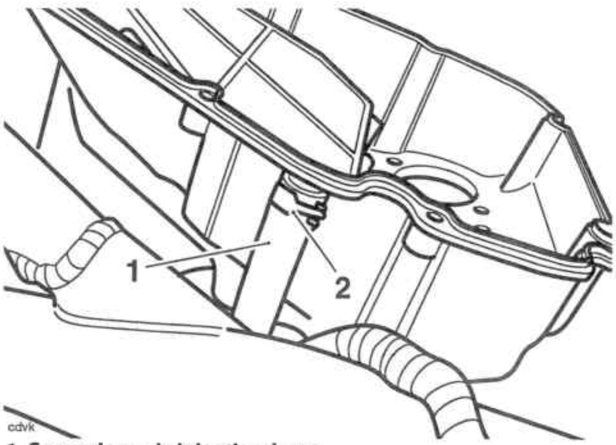
1. Airbox upper section
2. Fixings

8. Release the six fixings and remove the airbox intake trumpets.
9. Release the fixing securing the airbox to the frame.



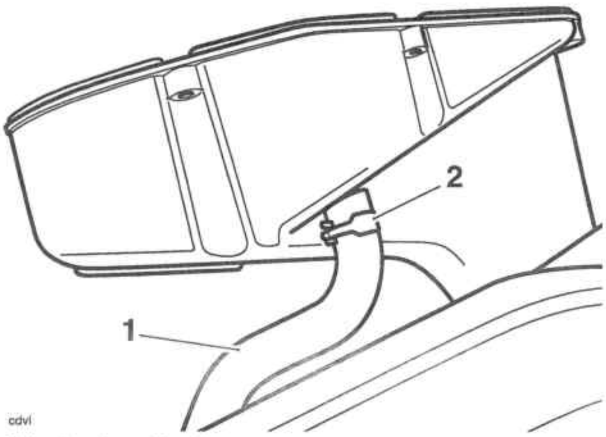
1. Airbox front fixing location
2. Airbox intake trumpet fixings

10. Release the spring hose clip and disconnect the secondary air injection hose at the airbox.



1. Secondary air injection hose
2. Spring hose clip

11. Release the spring hose clip and disconnect the engine breather hose at the airbox.



1. Engine breather hose
2. Spring hose clip

12. Remove the airbox from the motorcycle.

Inspection

1. Thoroughly clean the inside and outside of the airbox.
2. Check the airbox and intake trumpets for damage.
3. Check the air intake seal at the front of the airbox for damage.

Installation

1. Position the airbox to the frame.
2. Connect the engine breather hose and refit the spring hose clip.
3. Connect the secondary air injection hose and refit the spring hose clip.
4. Align the front of the air box to the frame and loosely install the fixing. Do not tighten the fixing at this stage.
5. Align the rear of the airbox to the throttle bodies and fit the airbox intake trumpets. Tighten the fixings to **6 Nm**.
6. Tighten the airbox front fixing to **3 Nm**.
7. Refit the airbox upper section and tighten the fixings to **1.5 Nm**.
8. Reconnect the air temperature and map sensor multi-plugs.
9. Reconnect the ECM connectors (see page *10-61*).
10. Refit the fuel tank (see page *10-106*).
11. Reconnect the battery, positive (red) lead first.
12. Refit the rider's seat (see page *16-11*).

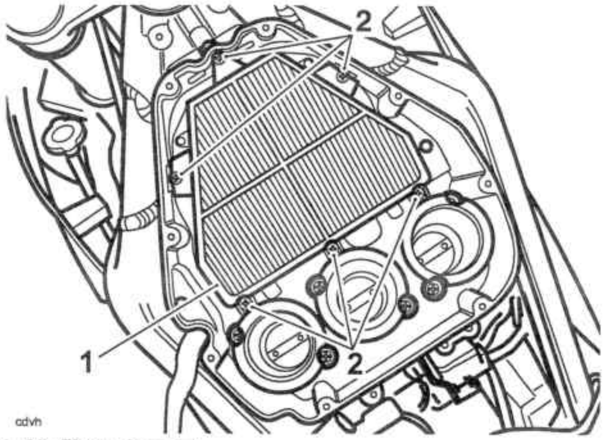
Air Filter Element

Removal

Note:

- **The air filter element can be accessed after first removing the airbox upper section. It is not necessary to remove the lower section.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox upper section (see page *10-110*).
5. Release the six fixings and remove the air filter element from the airbox lower section.



1. Air filter element
2. Fixings

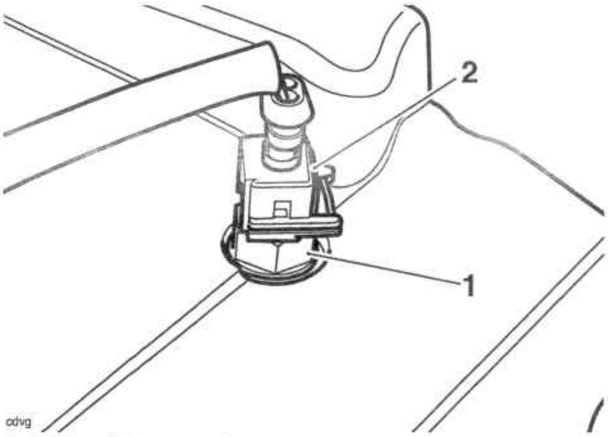
Installation

1. Thoroughly clean the inside and outside of the airbox.
2. Seat the air filter element in the lower section.
3. Secure the air filter element with the fixings. Tighten to **4 Nm**.
4. Refit the airbox upper section (see page *10-111*).
5. Refit the fuel tank (see page *10-106*).
6. Reconnect the battery, positive (red) lead first
7. Refit the rider's seat (see page *16-11*).

Intake Air Temperature Sensor

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Disconnect the intake air temperature sensor multi-plug.



1. Intake air temperature sensor
2. Multi-plug

Note:

- **The intake air temperature sensor has a threaded base.**

5. Unscrew the sensor to remove it from the airbox.

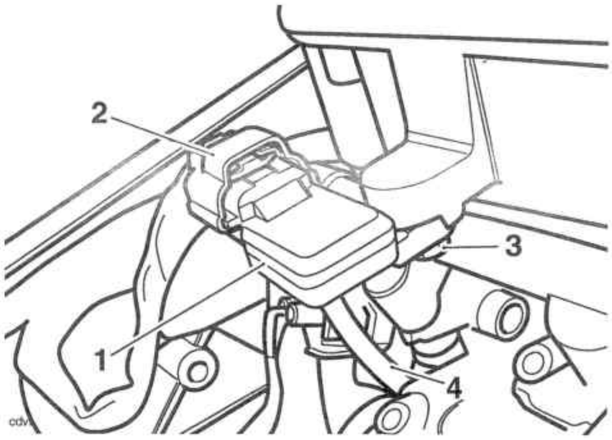
Installation

1. Fit the air temperature sensor to the airbox. Tighten the sensor to **4 Nm**.
2. Reconnect the intake air temperature sensor multi-plug.
3. Refit the fuel tank (see page *10-106*).
4. Reconnect the battery, positive (red) lead first.
5. Refit the rider's seat (see page *16-11*).

Map Sensor

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Disconnect the map sensor multi-plug.



1. Map sensor
2. Multi-plug
3. Fixing
4. Vacuum hose

5. Disconnect the vacuum hose from the sensor.
6. Release the fixing screw securing the sensor to the airbox and remove the sensor.

Installation

1. Fit the sensor to the airbox, tightening the fixing to **3 Nm**.
2. Refit the vacuum hose.
3. Reconnect the map sensor multi-plug.
4. Refit the fuel tank (see page *10-105*).
5. Reconnect the battery, positive (red) lead first.
6. Refit the rider's seat (see page *16-11*).

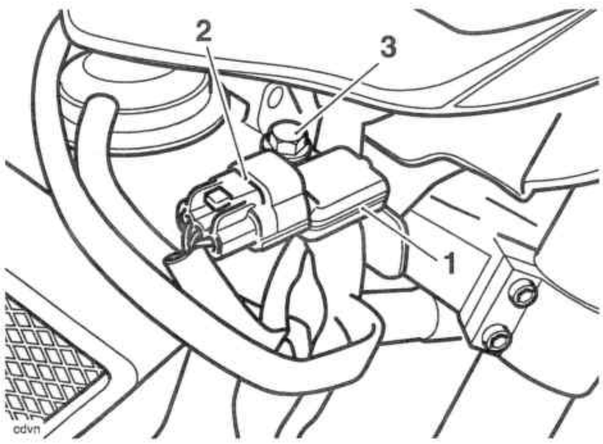
Barometric Pressure Sensor

Removal

Note:

- **The barometric pressure sensor is located on the intake air duct behind the fairing cockpit. It is not necessary to remove the cockpit to access the sensor.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the windscreen (see page *16-15*).
4. Disconnect the multi-plug.
5. Release the fixing securing the sensor to the intake air duct and remove the sensor.



1. Barometric pressure sensor (cockpit shown removed for clarity)
2. Multi-plug
3. Fixing

Installation

1. Fit the sensor to the intake air duct, tightening the fixing to **3 Nm**.
2. Reconnect the multi-plug.
3. Refit the windscreen (see page *16-15*).
4. Reconnect the battery, positive (red) lead first.
5. Refit the rider's seat (see page *16-11*).

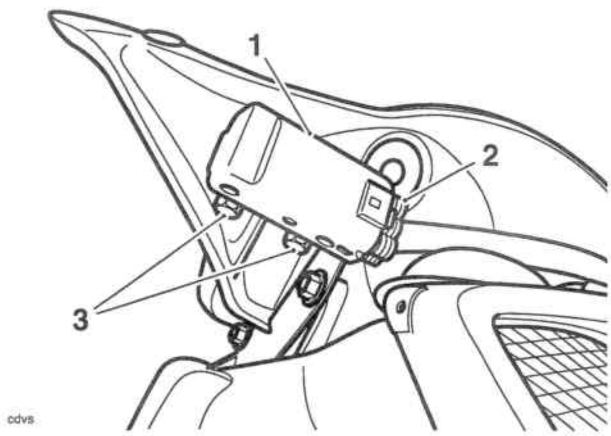
Fall Detection Switch

Removal

Note:

- **The fall detection switch is located on the instrument bracket behind the fairing cockpit. It is not necessary to remove the cockpit to access the switch.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the windscreen (see page *16-15*).
4. Disconnect the multi-plug.
5. Release the fixings securing the switch to the instrument bracket and remove the switch.



1. Fall detection switch (cockpit shown removed for clarity)
2. Multi-plug
3. Fixings

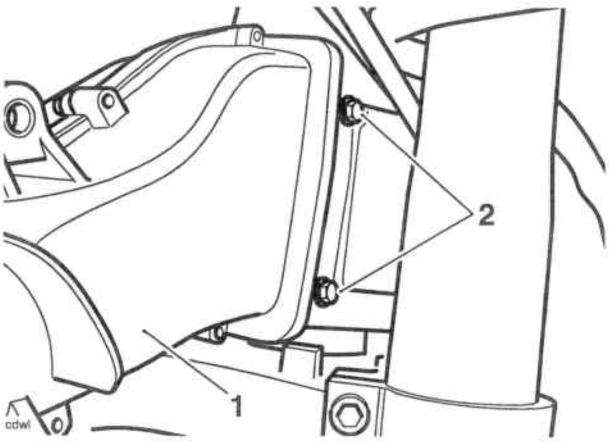
Installation

1. Fit the switch to the instrument bracket, tightening the two fixings to **3 Nm**.
2. Reconnect the multi-plug.
3. Refit the windscreen (see page *16-15*).
4. Reconnect the battery, positive (red) lead first.
5. Refit the rider's seat (see page *16-11*).

Intake Air Duct

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit (see page *16-16*).
4. Remove the barometric pressure sensor (see page *10-113*).
5. Detach the instrument pack bracket, together with the fall sensor and its bracket (see page *17-11*) and tie aside.
6. Disconnect the vacuum hose from the intake air flap actuator.
7. Release the four fixings securing the intake air duct to the frame headstock and remove the duct.



1. Intake air duct
2. Fixings (left hand shown)

Installation

1. Position the duct to the frame headstock and refit the four fixings. Tighten the fixings to **7 Nm**.
2. Reconnect the intake air flap actuator vacuum hose.
3. Refit the instrument bracket and fall detection switch bracket (see page *17-11*).
4. Refit the barometric pressure sensor (see page *10-113*).
5. Refit the cockpit (see page *16-16*).
6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (see page *16-11*).

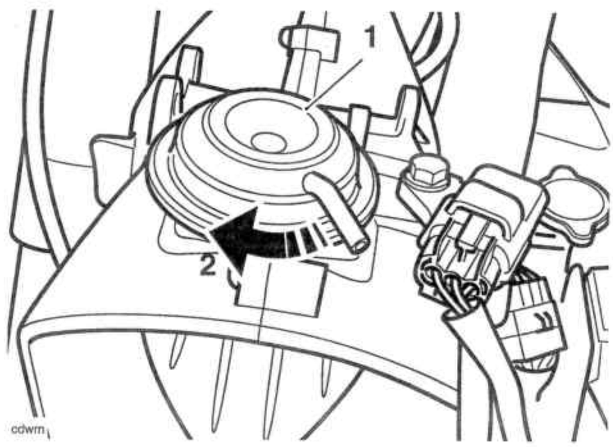
Intake Air Flap Actuator

Operation

The intake air flap actuator is located on the intake air duct, forward of the instruments. It is vacuum operated, being controlled by a solenoid valve which is in turn operated by the ECM.

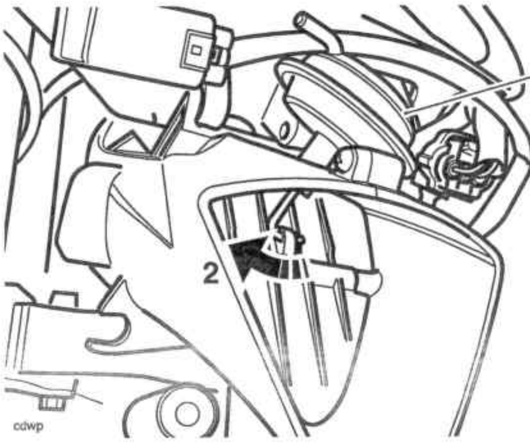
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit (see page *16-16*).
4. Remove the grille from the intake air duct.
5. Disconnect the vacuum hose from the intake air flap actuator.
6. Rotate the actuator one quarter turn clockwise to release it from the intake air duct.



1. Actuator
2. Actuator release direction

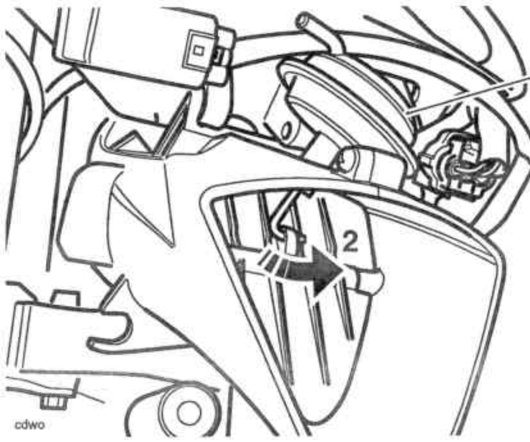
7. Disconnect the actuator rod from the intake air flap and remove the actuator.



1. Actuator
2. Actuator rod removal direction

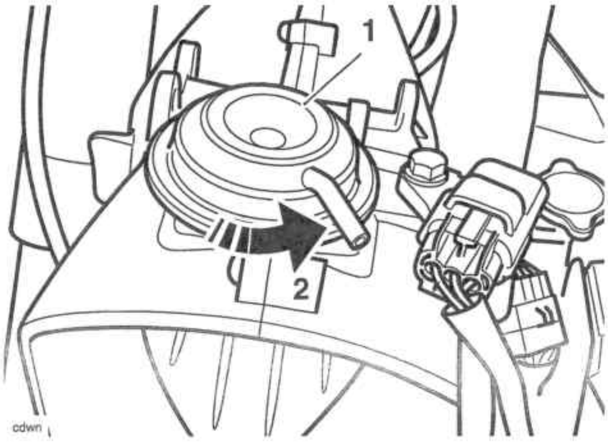
Installation

1. Position the actuator to the intake air duct and connect the actuator rod to the intake air flap.



1. Actuator
2. Actuator rod installation direction

2. Rotate the actuator one quarter turn anti-clockwise to refit the actuator to the intake air duct.



1. Actuator
2. Actuator installation direction

3. Reconnect the intake air flap actuator vacuum hose.
4. Refit the intake air duct grille.
5. Refit the cockpit (see page *16-16*).
6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (see page *16-11*).

Crankshaft position sensor

Note:

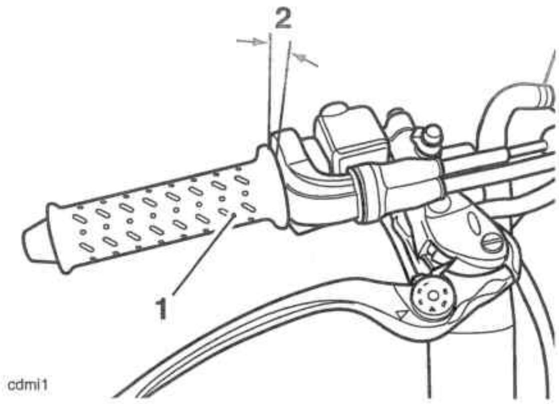
- **The alternator stator and crankshaft position sensor are supplied as an assembly and cannot be separated.**
- **For additional information, refer to alternator (see page *17-17* for removal and page *17-19* for installation).**

Throttle Cable

Adjustment

Note:

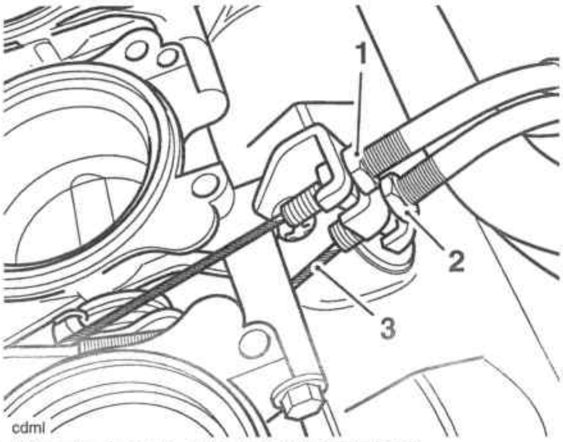
- **Minor adjustments to the opening cable can be made using the adjuster near the throttle grip end of the throttle. Where a correct setting cannot be achieved this way, the adjusters at the throttle end of both cables must be used. The opening cable must be set first followed by the closing cable.**



1. Throttle grip
2. Correct setting, 2-3 mm

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Set the 'opening' cable adjuster at the throttle grip end such that it has an equal amount of adjustment in each direction. Tighten the locknut.
4. Remove the fuel tank (see page *10-105*).
5. Remove the airbox (see page *10-110*).

6. Set the 'opening' cable adjuster at the throttle body end to give 2-3 mm of play at the throttle grip. Tighten the locknut.



1. 'Opening' Cable Adjuster (Throttle End)
2. 'Closing' Cable Adjuster (Throttle End)
3. Closing cable – free play measurement point

7. With the throttle fully closed, ensure that there is 2-3mm of free play in the 'closing' cable. Adjust if necessary ensuring that the locknut is secure afterwards.

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 motorcycle control and an accident.

Warning

Move the handlebars to left and right full lock while checking that cables and harnesses do not bind. Cables or harness that bind will restrict the steering and may cause loss of motorcycle control and an accident.

Warning

Ensure that the adjuster locknuts are tightened. A loose throttle cable adjuster could cause the throttle to stick leading to loss of motorcycle control and an accident.

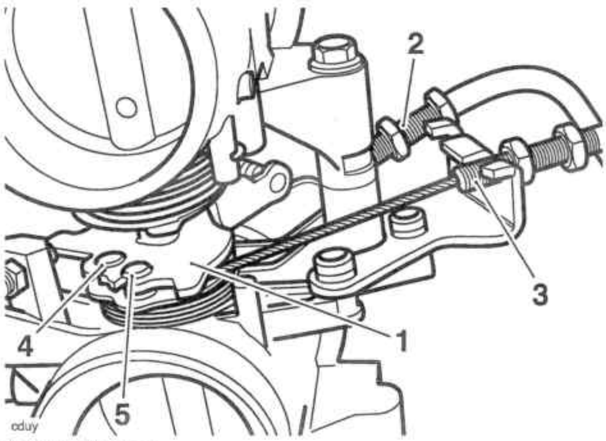
8. Refit the airbox (see page *10-111*).
9. Refit the fuel tank (see page *10-106*).
10. Reconnect the battery, positive (red) lead first.
11. Refit the rider's seat (see page *16-11*).

Removal

Note:

- **Before beginning to remove the throttle cables, note the exact routing and location of both cables to help ensure that they are returned to the same locations and routing on assembly.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first. (see page *17-7*).
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Detach the throttle bodies (see page *10-119*).
6. Slacken the adjuster locknuts at the throttle body end of the cables such that they will allow the outer cables to be detached from the cable bracket.
7. Detach the inner cable nipples from the throttle cam.

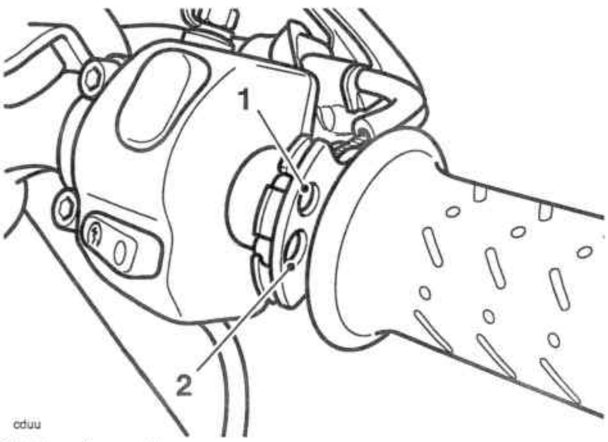


1. Throttle cam
2. Opening cable
3. Closing cable
4. Opening cable nipple
5. Closing cable nipple

8. At the throttle grip end, slide off the rubber boot and release the screws which secure the two halves of the throttle grip guide to each other.

1. Throttle grip guide
2. Screws
3. Rubber boot

9. Separate the two halves of the guide then release the inner cables from the throttle grip.



1. Opening cable
2. Closing cable

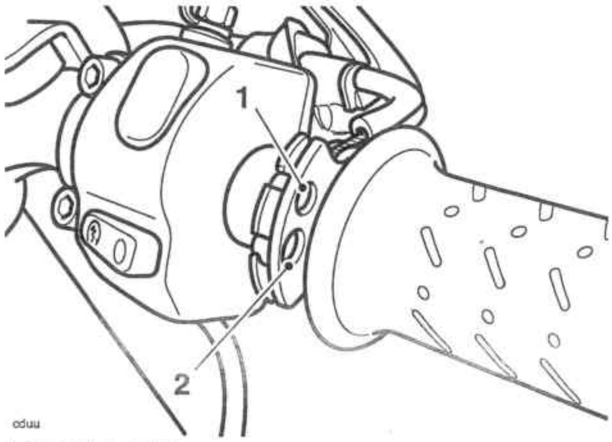
10. Detach the cables from the motorcycle.

Inspection

1. Check that both the throttle cables operate smoothly, without sticking or binding. Replace the cables if there is any doubt as to their correct operation.

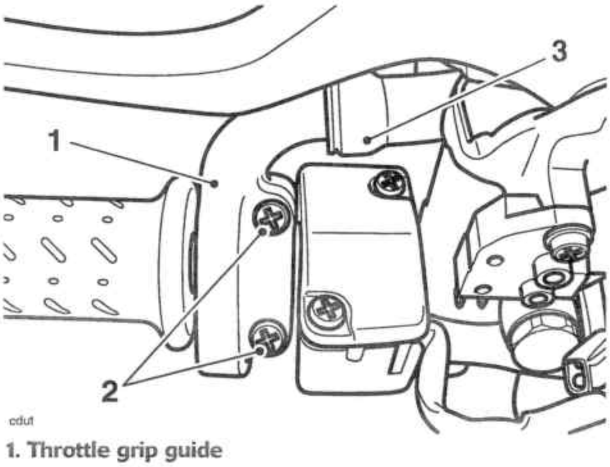
Installation

1. Locate the cables to the frame following the routing noted during removal.
2. Engage the inner cable nipples to the throttle grip, ensuring the 'opening' cable is located in the upper slot in the throttle grip, and the 'closing' cable is located to the lower slot.



1. Opening cable
2. Closing cable

3. Assemble the two halves of the cable guide ensuring that the outer cables are correctly located in the guide and the guide is positioned on the handlebars as noted prior to removal.



1. Throttle grip guide
2. Rubber boot
3. Screws

4. Refit the boot.
5. Attach the other end of the inner cables to the throttle cam ensuring the opening cable is fitted to the top of the cam and the closing cable to the bottom.
6. Locate the outer cables to the bracket and secure with the adjuster and locknuts.
7. Refit the throttle bodies (see page *10-120*).
8. Set the throttle cable adjustment (see page *10-116*).
9. Refit the airbox (see page *10-111*).
10. Refit the fuel tank (see page *10-106*).
11. Reconnect the battery, positive (red) lead first
12. Refit the rider's seat (see page *16-11*).

Throttle Bodies/Injectors

Removal

Note:

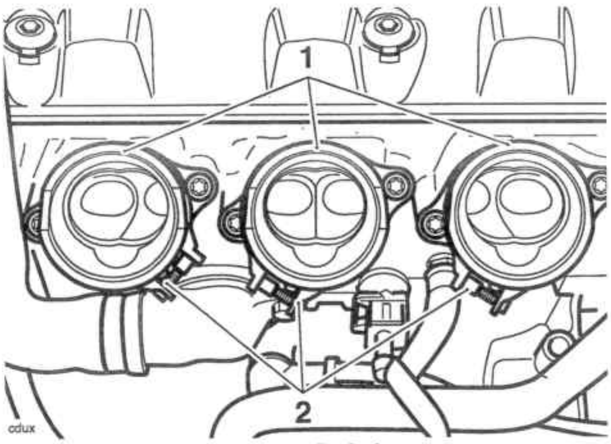
- **Because fuel stored in the fuel rail will be at 3 bar pressure, it is essential that the fuel pressure is reduced before any dismantling of the fuel rail takes place. To reduce pressure, briefly crank the engine with the fuel pump disconnected.**

Warning

If the fuel rail is dismantled without first reducing pressure fuel may escape causing clothing and components to be coated with fuel.

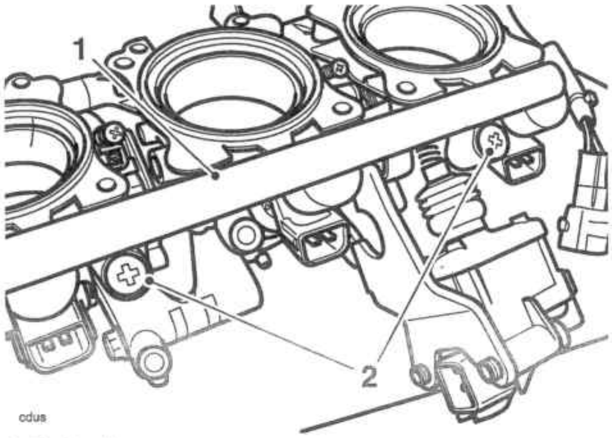
This would represent a serious fire hazard which could lead to burn injuries and damage to property.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Disconnect the throttle position sensor multi-plug.
6. Disconnect the fuel injector multi-plugs.
7. Disconnect the idle speed control stepper motor multi-plug.
8. Release the clips securing the throttle bodies to the transition pieces.



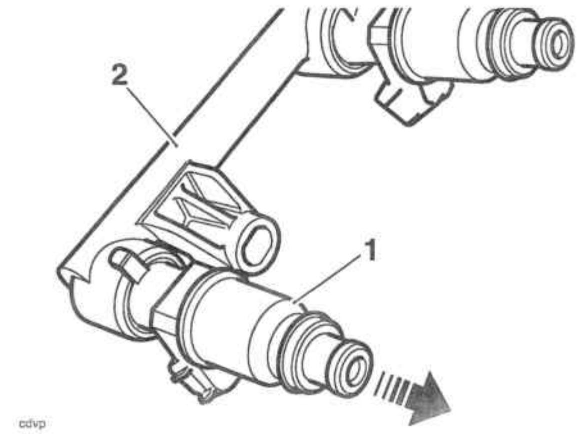
1. Transition piece (one per cylinder)
2. Clip location (throttle bodies removed for clarity)

9. Ease the throttle bodies from the transition pieces and lay the assembly carefully on the cam cover.
10. Release both throttle cables from the throttle cam (see page *10-116*).
11. Remove the throttle bodies.
12. If required, release the screws securing the fuel rail to the throttle bodies.



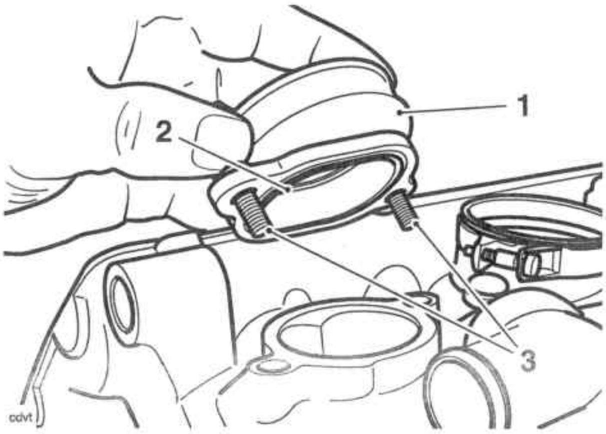
1. Fuel rail
2. Fuel rail screws

13. Ease the fuel rail and injectors from the throttle bodies.
14. To detach the injectors from the fuel rail, gently ease the injector from the rail.



1. Injector
2. Fuel rail

15. To detach the transition pieces from the head, release the screws, raise the transition pieces and collect the O-rings.



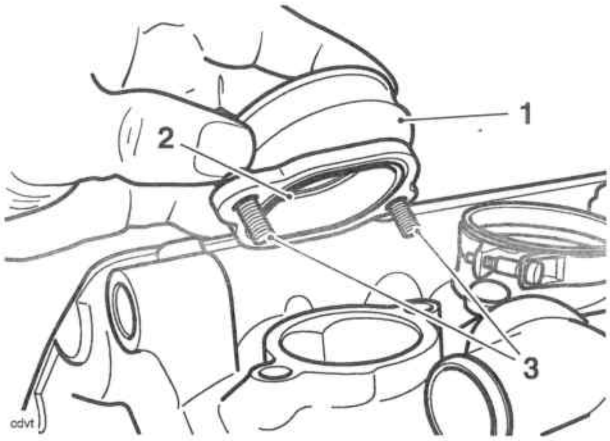
1. Transition piece
2. O-ring
3. Fixings

Inspection

1. Check all joints and seals for splits, cuts and damage.
2. Check the throttles for sticking, loose or damaged throttle plates.
3. Check the transition piece O-rings for damage.

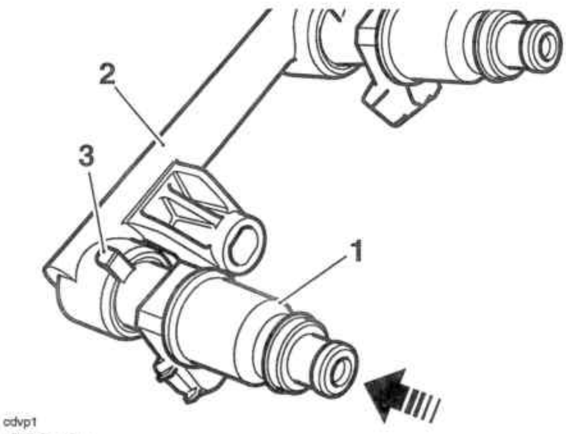
Installation

1. Thoroughly clean the transition piece to cylinder head mating faces.
2. Refit the transition pieces to the head incorporating new O-rings to the joint face. Tighten the transition piece fixings to **12 Nm**.



1. Transition piece
2. O-ring
3. Fixings

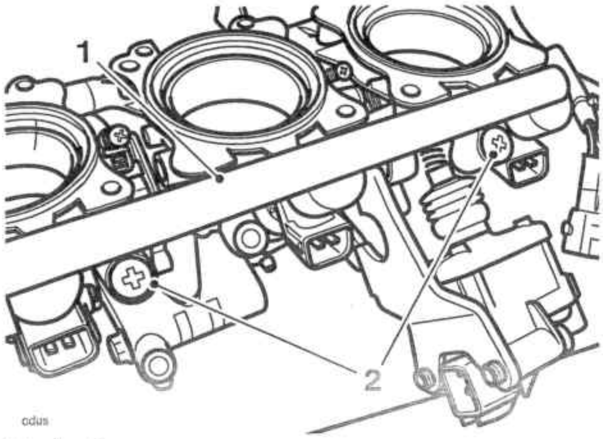
3. If the injectors have been removed from the fuel rail, refit them to the rail, ensuring the injector locating peg is fully engaged in the slot in the rail.



1. Injector
2. Fuel rail
3. Locating peg

4. Check the injector O-rings for splits and other damage. Replace as necessary.

5. Refit the injectors and fuel rail to the throttle bodies. Tighten the fuel rail screws to **6 Nm**.

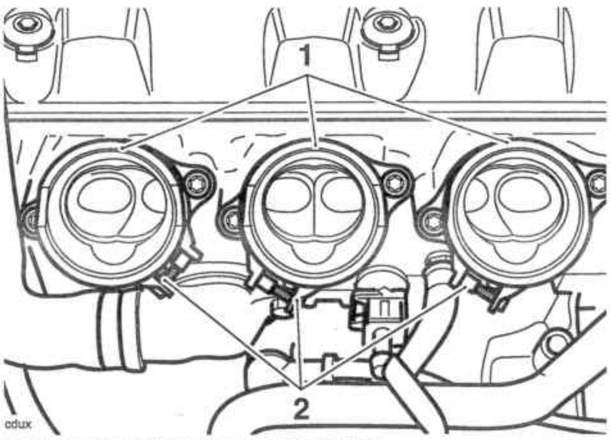


1. Fuel rail
2. Fuel rail screwss

6. Re-attach the throttle cables (see page *10-116*).

> **⚠ Warning**
>
> The throttle body clips must be positioned as shown below. If the clips are not positioned as shown this could cause the throttle to stick, leading to loss of motorcycle control and an accident.

7. Refit the throttle bodies to the transition pieces and secure with the clips.



1. Transition piece (one per cylinder)
2. Clip location (throttle bodies removed for clarity)

8. Adjust the throttle cables (see page *10-116*).
9. Reconnect the idle speed control stepper motor multi-plug.
10. Reconnect the fuel injector multi-plugs.
11. Reconnect the throttle position sensor multi-plug.
12. Refit the airbox (see page *10-111*).
13. Refit the fuel tank (see page *10-106*).
14. Reconnect the battery, positive (red) lead first.
15. Refit the rider's seat (see page *16-11*).

Throttle Body Balancing

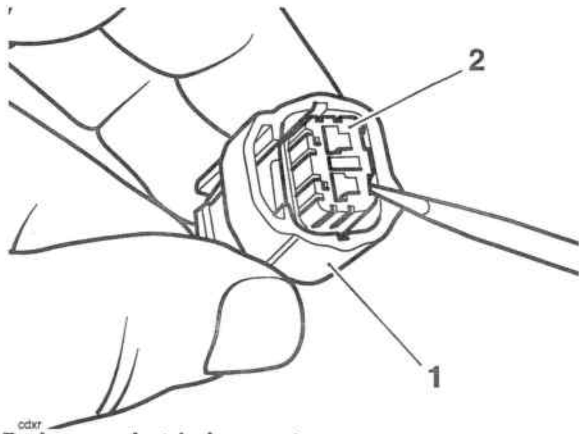
Note:

- **The throttles cannot be balanced using equipment to measure vacuum in each throttle. Instead, the Triumph diagnostic tool must be used.**

1. Remove the rider's seat (see page *16-11*).
2. Remove the fuel tank (see page *10-105*) and place on a suitable support, close to the motorcycle.
3. Remove the airbox (see page *10-110*).

> **⚠ 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. Turn the ignition to the 'OFF' position.
6. Using a suitable tool, carefully remove the insert from the fuel pump electrical connector on the main harness. DO NOT discard the insert, as this will be refitted at the end of the procedure.



1. Fuel pump electrical connector
2. Connector insert

> **⚠ Caution**
>
> Ensure the connector terminals of the main harness, fuel pump assembly or extension cable T3880123 are not bent or damaged when connecting or disconnecting the extension cable to or from the motorcycle.

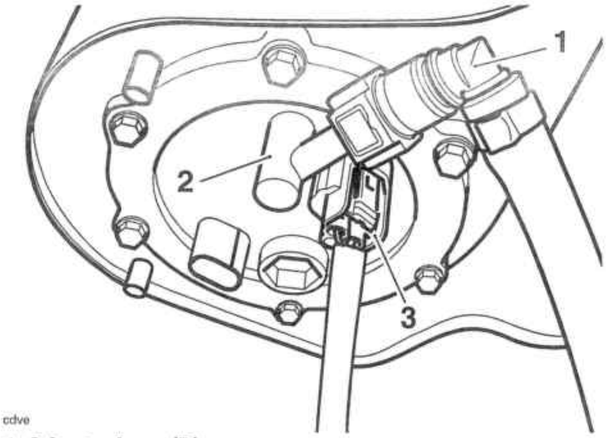
7. Using the extension cable T3880123, carefully connect the fuel pump connection on the main harness to the fuel tank. Connect the other end of the harness extension to the motorcycle main harness.

8. Select the fuel pressure gauge adapter marked 'B' from service tool T3880001.

Warning

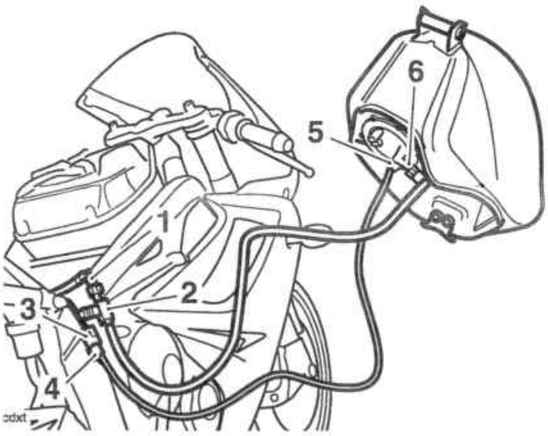
Always us the correct fuel pressure gauge adapter (adapter 'B' for Daytona 675). Use of an incorrect adapter will result in a fuel leak. A fuel leak can result in a fire causing damage to property and injury to persons.

9. Connect the adapter hose to the fuel pump plate outlet as shown in the illustration below.



1. Adaptor hose 'B'
2. Fuel pump plate outlet
3. Tool T3880123

10. Connect the fuel hose to the adaptor hose as shown in the illustration below.



1. Motorcycle fuel hose
2. Adaptor hose 'B'
3. Fuel pump connection
4. Wiring extension T3880123
5. Fuel pump connection
6. Fuel pump plate outlet

11. Attach exhaust extraction hoses to the silencer.
12. Start the engine, and allow to idle.
13. On the diagnostic tool navigate to 'ADJUST TUNE' (see page *10-24*).
14. Select 'BALANCE THROTTLES'.

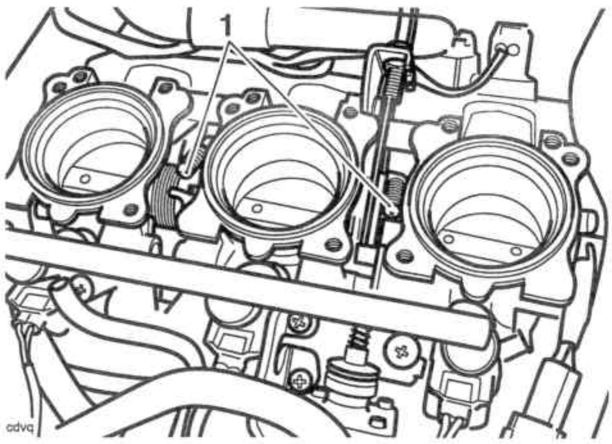
T	H	R	O	T	T	L	E	S		B	A	L	A	N	C	E	D		
T	H	R	O	T	T	L	E		1		1	2	3	4	M	M	/	H	G
T	H	R	O	T	T	L	E		2		1	2	3	4	M	M	/	H	G
T	H	R	O	T	T	L	E		3		1	2	3	4	M	M	/	H	G

Balance Throttles Screen

Note:

- **The balance throttle screens show the vacuum valve of each throttle in mm/hg. In addition, when the throttles are balanced to an acceptable range of each other the word 'balanced' will appear in the top right hand corner of the screen. At this point, no further adjustment is necessary or productive.**
- **The adjusters operate on the outer cylinders only (cylinders 1 and 3). The centre throttle (cylinder 2) adjustment is fixed, this being controlled by the idle speed control stepper motor. Note that the centre reading will alter slightly as the two outer cylinders are adjusted.**
- **DO NOT attempt to adjust the centre throttle stop screw, located below the idle stepper motor. The stop screw is set at the factory during manufacture, and must not be adjusted.**

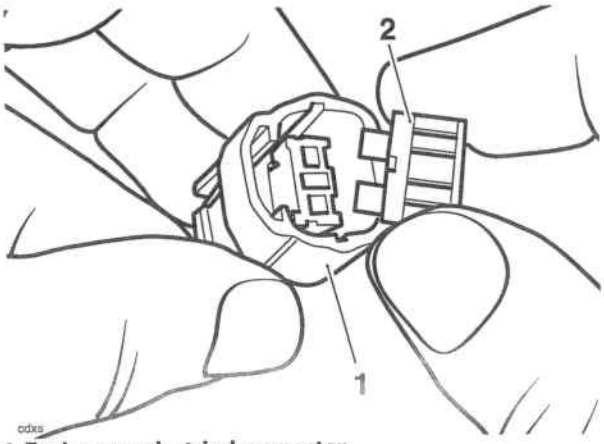
15. Using the throttle adjusters, make adjustments to the two outer cylinders until the word 'BALANCED' appears.



1. Adjusters

16. When balanced, stop the engine and disconnect the diagnostic tool.
17. Disconnect the fuel pressure gauge adapter and wiring extension.

18. Refit the insert to the fuel pump electrical connector on the main harness



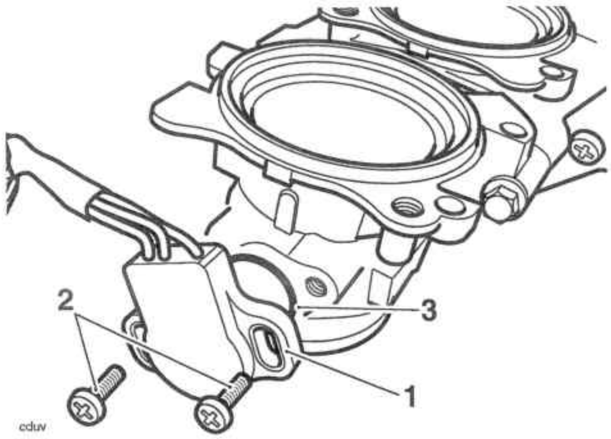
1. Fuel pump electrical connector
2. Connector insert

19. Refit the airbox (see page *10-111*).
20. Refit the fuel tank (see page *10-106*).
21. Remove the exhaust extraction hoses from the silencer.
22. Reconnect the battery, positive (red) lead first.
23. Refit the rider's seat (see page *16-11*).

Throttle Position Sensor

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Remove the throttle body assembly (see page *10-119*).
6. Release the two screws and rotate the throttle position sensor clockwise through 45° to remove it from the left hand end of the throttle body. Collect the O-ring on disassembly.



1. Throttle position sensor
2. Screws
3. O-ring

Installation

1. Fit the replacement throttle position sensor ensuring the O-ring is positioned correctly between the sensor and throttle body. Rotate the sensor through 45° anti-clockwise until the screw holes align.
2. Engage the new screws and washers supplied and part tighten such that the sensor can still be rotated.
3. Position the throttle body assembly near to its fitted position and reconnect the sensor.
4. Reconnect the battery, positive (red) lead first.
5. Attach the Triumph diagnostic tool to the dedicated plug (see page *10-38*).
6. Turn the ignition to the 'ON' position.
7. On the diagnostic tool navigate to and select the 'ADJUST TUNE' option.

8. At the next screen, align the cursor with THROTTLE POT RENEW (see below) then press the validation key which is marked '*'.

									A	D	J	U	S	T		T	U	N	E
	R	E	S	E	T		A	D	A	P	T	I	O	N	S				
▶	T	H	R	O	T	T	L	E		P	O	T		R	E	N	E	W	
	I	S	C		S	T	E	P	P	E	R		R	E	N	E	W		

9. On pressing the validation key, the diagnostic tool will send a command, which drives the primary throttle to the fully closed position. The tool will also display the voltage reading coming from the throttle position sensor.

	R	E	P	L	A	C	E		P	R	I	M	A	R	Y		T	P	S
					T	H	R	O	T	T	L	E		C	L	O	S	E	D
C	U	R	R	E	N	T		V	O	L	T	S		0	.	5	6	V	

10. Gently rotate the new throttle position sensor until the voltage reading on the tool shows 0.6 Volts +/- 0.02 Volts.

Note:

- **This is a setting voltage only. Because of the adaptive nature of the engine management system, the in-service voltage may vary from this setting figure.**

11. Tighten the sensor retaining screws to **2 Nm** and recheck the voltage reading shown on the tool. Repeat the adjustment if the reading is outside the specified range.
12. Press the validation key marked '*' to return the throttle to normal control and return the diagnostic tool to the 'ADJUST TUNE' menu.
13. Disconnect the diagnostic tool.
14. 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

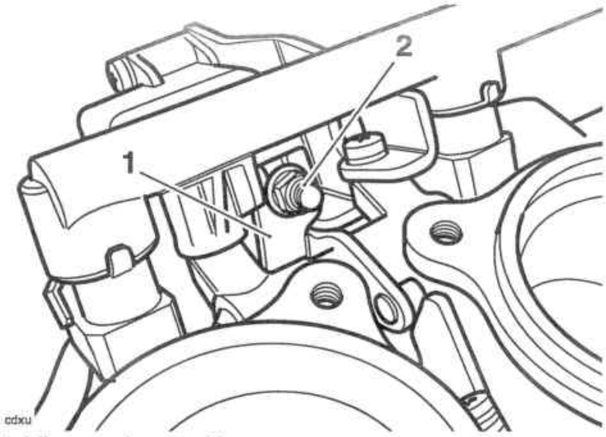
Operation of the motorcycle with an incorrectly adjusted, incorrectly routed or damaged throttle cable could interfere with the operation of the brakes, clutch or the throttle itself. Any of these conditions could result in loss of control of the motorcycle and an accident.

15. Disconnect the battery, negative (black) lead first.
16. Refit the throttle body assembly (see page *10-120*).
17. Refit the airbox (see page *10-111*).
18. Refit the fuel tank (see page *10-106*).
19. Reconnect the battery, positive (red) lead first.
20. Check and clear any stored faults using the diagnostic tool (see page *10-38*).
21. Refit the rider's seat (see page *16-11*).

Idle Speed Control Stepper Motor

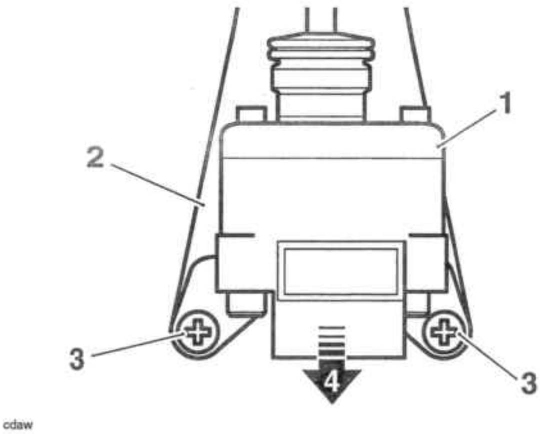
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Remove the throttle bodies (see page *10-119*).
6. Remove the nut, metal washer and plastic washer attaching the idle control stepper arm to the idle speed control lever.



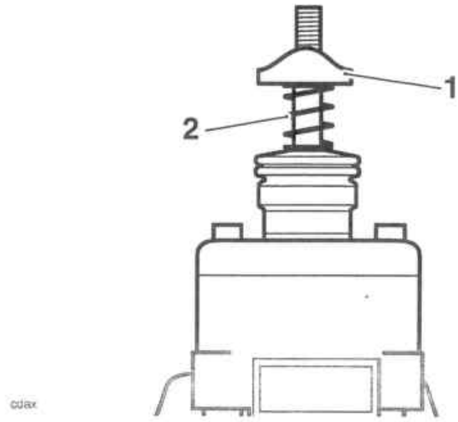
1. Idle speed control lever
2. Nut etc.

7. Remove the two screws securing the idle speed control stepper motor to its bracket, then remove the stepper motor in the direction shown.



1. Idle speed control stepper motor
2. Bracket
3. Fixings
4. Direction of removal

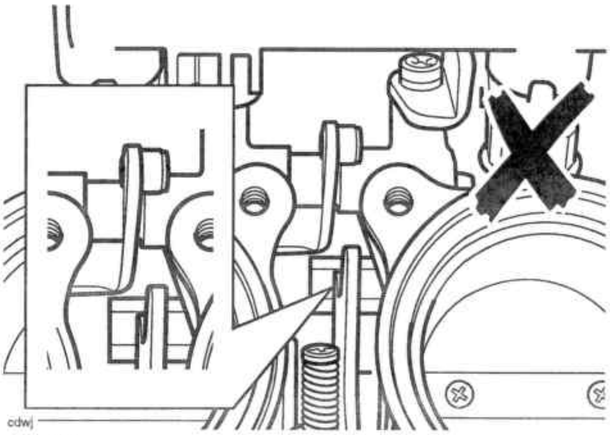
8. Leave the plastic collar and spring on the control stepper arm.

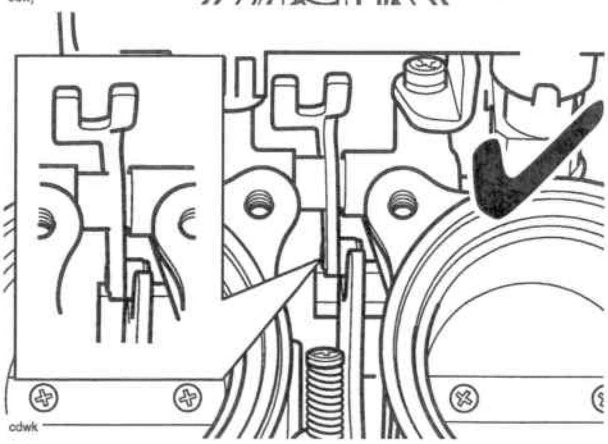


1. Collar
2. Spring

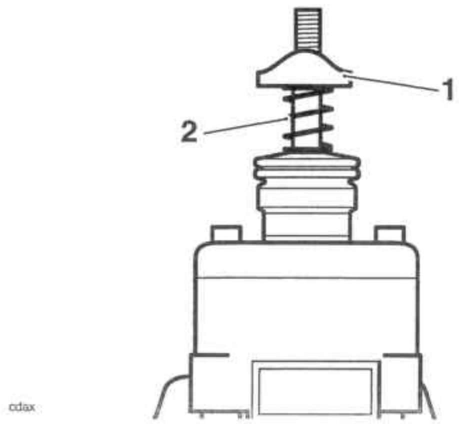
Installation

1. Ensure the Idle speed control lever is correctly positioned in relation to the throttle cam as shown below.



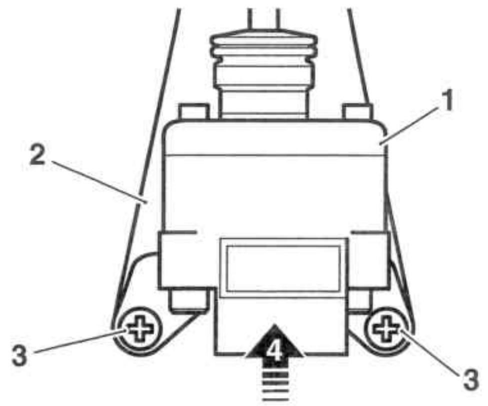


2. Loosely fit the spring and collar on the stepper arm.



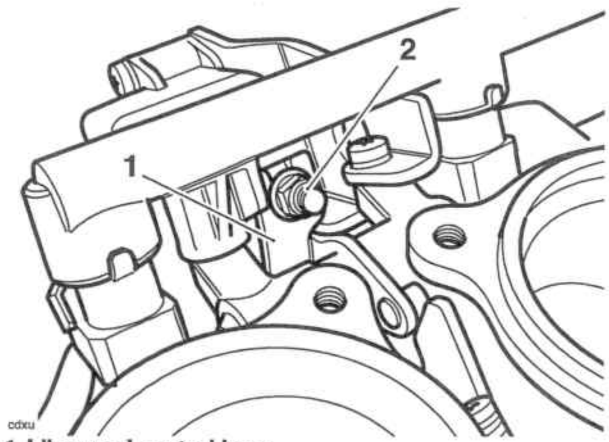
1. Collar
2. Spring

3. Locate the stepper motor to its bracket and tighten the fixings to **3.5 Nm**.



1. Idle speed control stepper motor
2. Bracket
3. Fixings
4. Direction of fitting

4. Fit the plastic washer to the lever then fit the metal washer and nut.



1. Idle speed control lever
2. Nut etc.

5. Mount the throttle body onto the engine.

6. Temporarily reconnect the battery, positive (red) lead first.
7. Attach the Triumph diagnostic tool to the dedicated plug (see page *10-38*).
8. Turn the ignition to the 'ON' position.
9. On the diagnostic tool navigate to and select the 'ADJUST TUNE' option.
10. At the next screen, align the cursor with 'ISC* STEPPER RENEW' then press the validation key which is marked '⁎'.

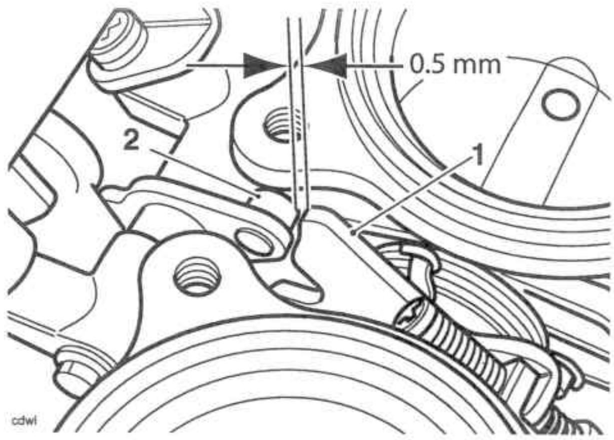
*ISC = Idle Speed Control

									A	D	J	U	S	T		T	U	N	E
	R	E	S	E	T		A	D	A	P	T	I	O	N	S				
	T	H	R	O	T	T	L	E		P	O	T		R	E	N	E	W	
▶	I	S	C		S	T	E	P	P	E	R		R	E	N	E	W		

11. On pressing the validation key, the diagnostic tool will send a command that drives the throttle to the fully closed position. The tool will also display the voltage reading coming from the throttle position sensor which will be needed for a check/adjustment made later in the process.

	R	E	P	L	A	C	E		I	S	C		S	T	E	P	P	E	R
					T	H	R	O	T	T	L	E		C	L	O	S	E	D
C	U	R	R	E	N	T		V	O	L	T	S			O	.	5	8	V

12. Tighten the stepper arm nut on the idle speed stepper motor until a clearance of 0.5 mm can be measured between the idle speed control cam and the throttle roller.

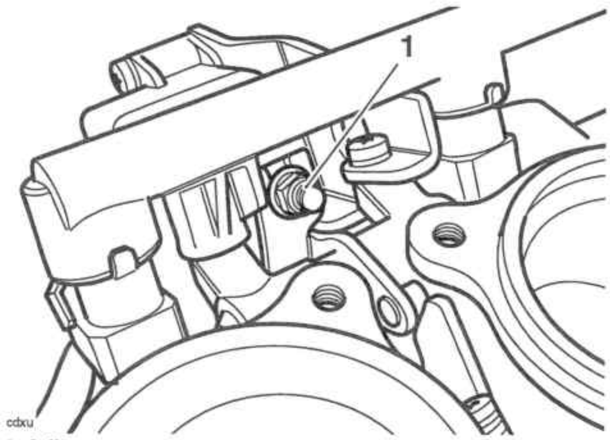


1. Idle speed control lever
2. Throttle roller

13. Check the voltage reading on the tool. If the reading is 0.6 Volts ±0.05 Volts, MAKE A NOTE OF THE EXACT VOLTAGE READING then proceed to step 17. If the reading is not within this tolerance band, adjustment must be made as described in paragraphs 14 to 16.
14. Slacken the screws on the throttle position sensor.
15. Gently turn the throttle position sensor until the voltage reading on the tool shows 0.6 Volts ±0.05 Volts. MAKE A NOTE OF THE EXACT VOLTAGE READING.
16. Tighten the sensor retaining screws to **2 Nm** and recheck the voltage reading shown on the tool. Repeat the adjustment if the reading is outside the specified range, NOTING THE FINAL VOLTAGE READING IF RE-ADJUSTMENT IS MADE.
17. Press the validation key marked '⁎' to progress to the next adjustment.
18. On pressing the validation key, the diagnostic tool will send a command that drives the throttle to the fully open position. The tool will also display the voltage reading coming from the throttle position sensor.

	R	E	P	L	A	C	E		I	S	C		S	T	E	P	P	E	R
					T	H	R	O	T	T	L	E		O	P	E	N		
C	U	R	R	E	N	T		V	O	L	T	S			0	.	7	2	V

19. With the stepper fully opened, check the voltage shown on the tool and adjust the nut on the top of the stepper arm until the tool shows a voltage equivalent to X + 0.12 Volts ±0.05 Volts where X = the voltage measured in step 14 (or 16 if re-adjusted).
For example, if the voltage measured was 0.6 Volts, then the correct setting would be 0.72 Volts ±0.05 Volts.



1. Adjustment nut

20. Press the validation key marked '⁎' to fully close the idle speed control stepper motor. After a minimum of 15 seconds (the tool will not allow further actions to take place during this period), press the validation key again to return the ECM to normal control.

Caution

Do not operate the throttle while the stepper motor is being adjusted, otherwise the incorrect value will be adapted and the engine will not start.

21. Turn the ignition to the 'OFF' position.
22. Disconnect the battery, negative (black) lead first.
23. Check and adjust the throttle cable settings (see page *10-116*).

Warning

Move the handlebars to left and right full lock while checking that the 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.

24. Refit the airbox (see page *10-111*).
25. Refit the fuel tank (see page *10-106*).
26. Reconnect the battery, positive (red) lead first.
27. Refit the rider's seat (see page *16-11*).

Engine Management Adaption

General Information

The engine management system fitted to the Daytona 675 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 changing rider behaviour, changes in the region in which the bike is operated (i.e. operation at high altitude where it was previously used at sea level) 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.

Typical Values

In a correctly adapted motorcycle, the following will be typical:

Function Examined	Read Out
Closed throttle position reference status	Yes (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:

1. Ensure the engine is cold.
2. WITHOUT TOUCHING THE THROTTLE, start the engine and allow it to warm up until the cooling fan comes on.
3. Leave the engine to idle for a further 12 minutes.

Note:

- **As an alternative to the above process, connect the diagnostic tool, scroll to 'ADJUST TUNE' 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.**

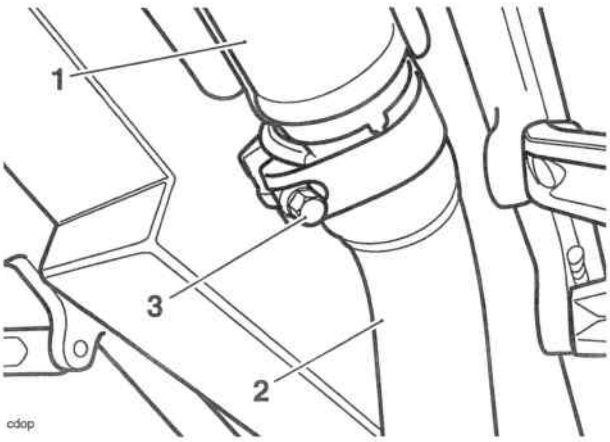
Exhaust System

Removal

Warning

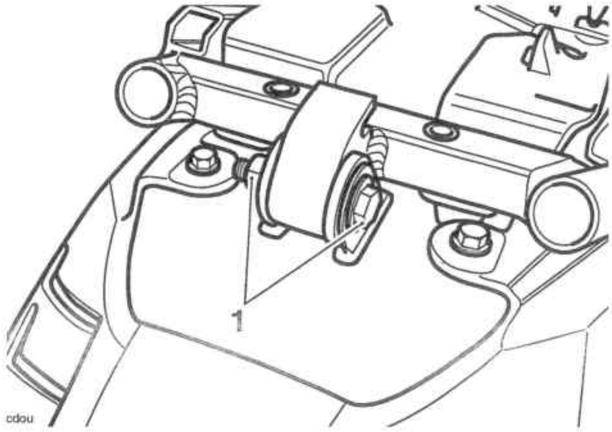
If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

1. Remove the seats (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the rear bodywork (see page *16-12*).
4. Disconnect the direction indicator and licence plate lamp electrical connector.
5. Release the clamp securing the silencer to the intermediate pipe.



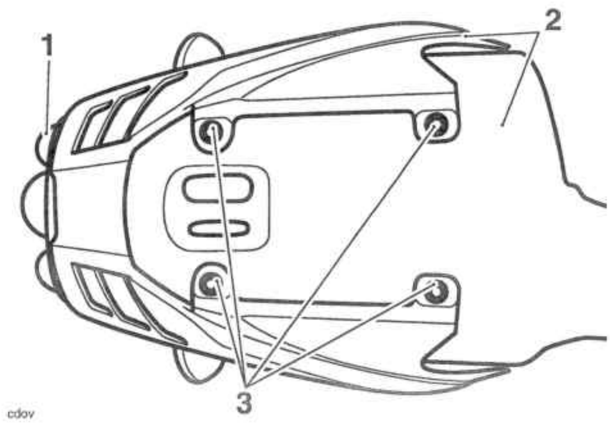
1. Silencer
2. Intermediate pipe
3. Clamp

6. Support the silencer and release the bolt and nut securing the silencer mounting bracket to the rear frame.



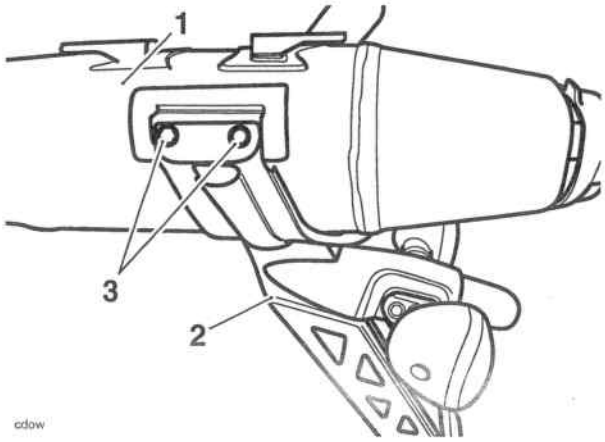
1. Silencer mounting bracket fixing

7. Move the silencer rearwards to disengage it from the intermediate pipe and remove.
8. If the rear light bracket is to be removed, release the four silencer heatshield fixings and remove the two heatshields.



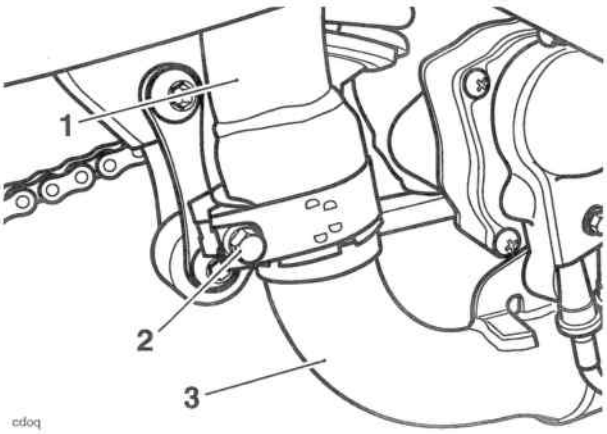
1. Silencer
2. Heatshields
3. Fixings

9. Release the four fixings and remove the rear light bracket from the silencer.



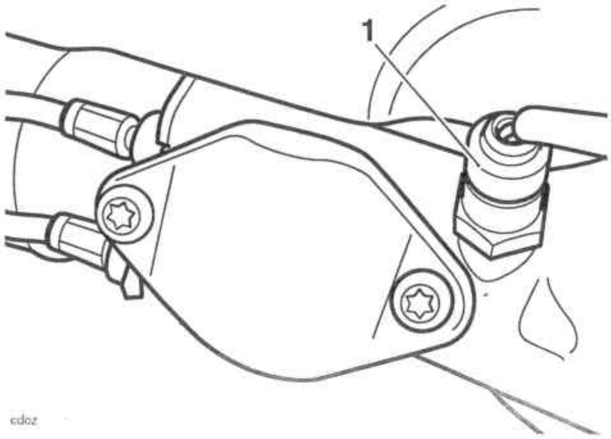
1. Silencer
2. Rear light bracket
3. Fixings (left hand shown)

10. Remove the lower fairings (see page *16-13*).
11. Release the clamp securing the intermediate pipe to the header pipe.



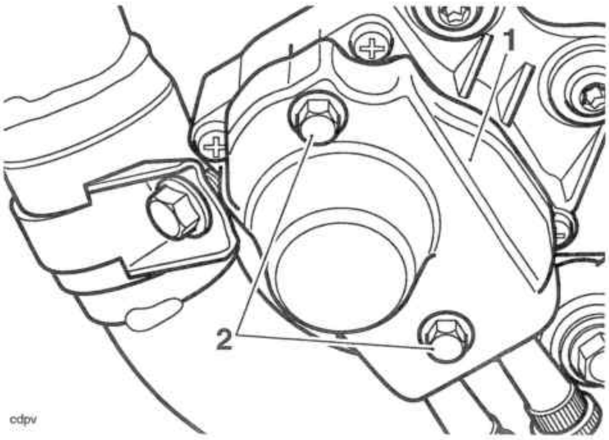
1. Intermediate pipe
2. Clamp
3. Header pipe

12. Disconnect the oxygen sensor from the main harness.



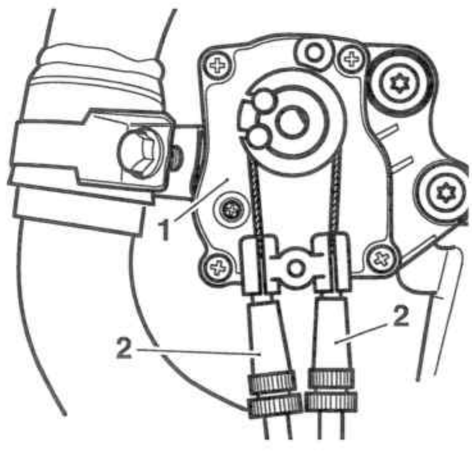
1. Oxygen sensor

13. Remove the cover from the butterfly valve cables on the actuator.



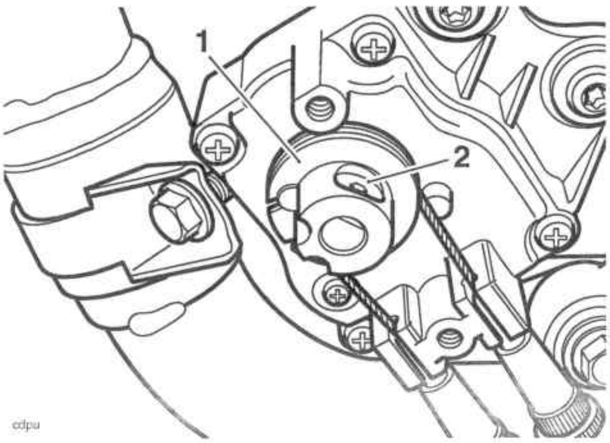
1. Cover
2. Fixings

14. Slacken both cable adjusters at the actuator to give the maximum amount of slack in the cables.



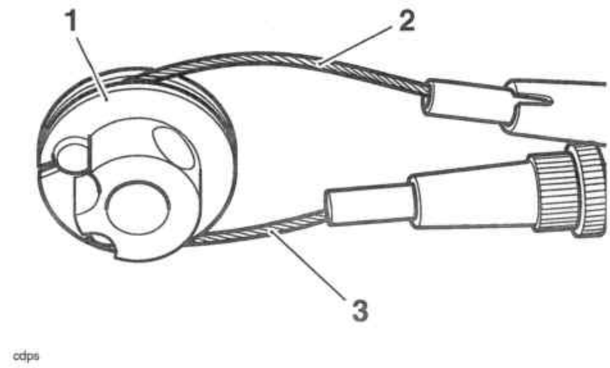
1. Actuator
2. Adjusters

15. Remove and discard the actuator pulley wheel fixing.



1. Actuator pulley wheel
2. Fixing

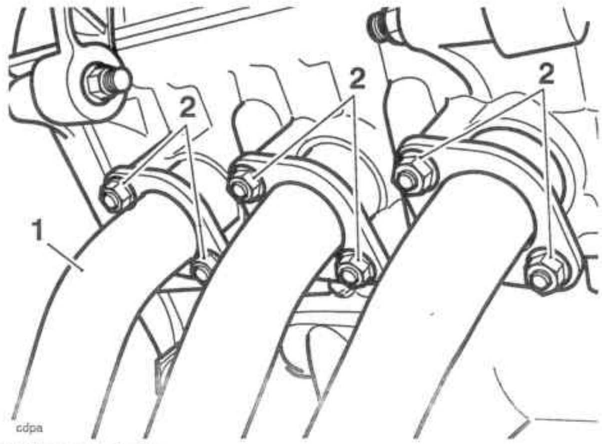
16. Slide the actuator pulley off the actuator shaft.
17. Slide the outer portion of the cables out of the actuator.
18. Detach the inner portion of the cables from the actuator pulley wheel.



1. Actuator pulley wheel
2. Opening cable
3. Closing cable

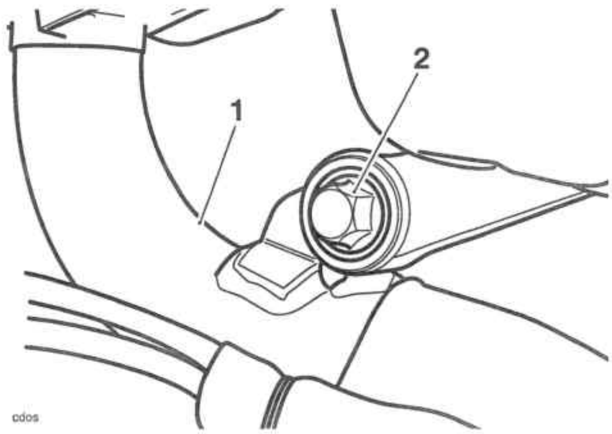
19. Remove the radiator (see page *11-8*).

20. Release the fixings securing the header pipe joints to the cylinder head. Discard the fixings.



1. Header pipes
2. Fixings

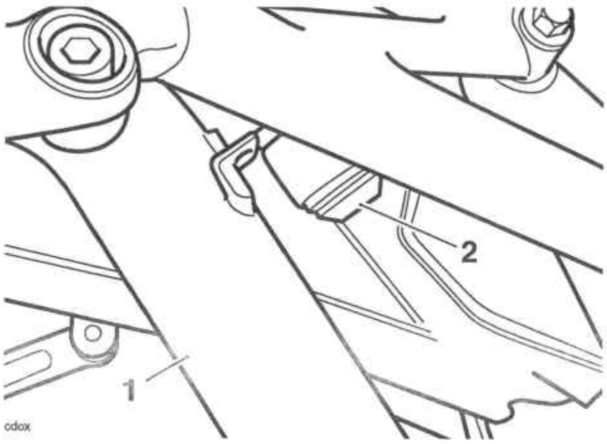
21. Remove the bolt from the header pipe rear mounting point.



1. Header pipe
2. Header pipe rear mounting point

22. Detach the header pipe assembly and collect the seals from the cylinder head ports.

23. Remove the intermediate pipe fixing and remove the intermediate pipe downwards through the swinging arm.



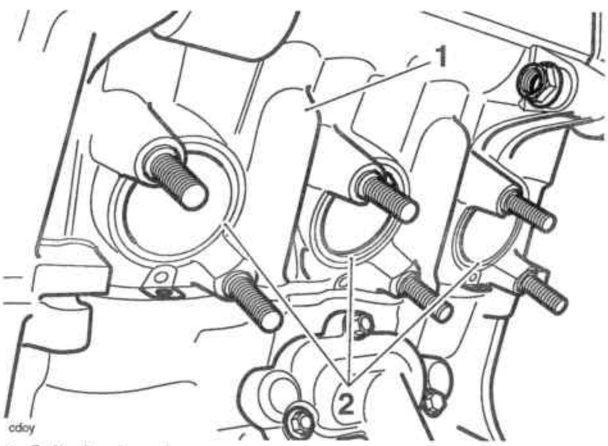
1. Intermediate pipe
2. Fixing

Assembly

1. Refit the intermediate pipe upwards through the swinging arm and tighten the fixing to **22 Nm.**
2. Fit new seals to the cylinder head.

Note:

- **A smear of grease may be used to retain the seals in the cylinder head during assembly.**

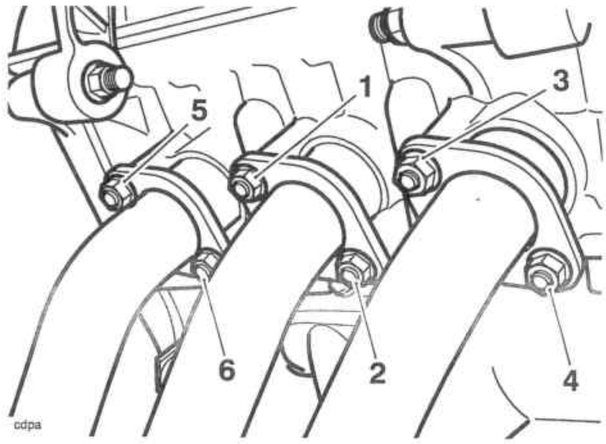


1. Cylinder head
2. Seals

3. Locate the header pipes and align the header pipe flanges to the fixing points. Fit new nuts and hand tighten.
4. Assemble the rear mounting point fixing but do not tighten at this stage.
5. Tighten the header pipe to cylinder head nuts in the sequence shown below:

   a)Tighten the header pipe nuts to 2 Nm.

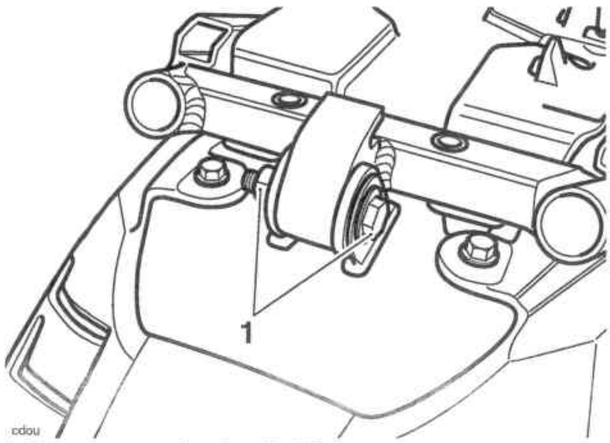
   b)Tighten the header pipe nuts to 19 Nm.



Header Pipe Tightening Sequence

6. Tighten the rear mounting point fixing to **19 Nm**.
7. Refit the radiator and refill the cooling system (see page *11-9*).
8. Connect the butterfly valve control cables and pulley wheel to the actuator (see page *10-136*, from paragraph 3 to paragraph 6).
9. Adjust the butterfly valve control cables (see page *10-137*, from paragraph 6 to paragraph 24).
10. Refit the oxygen sensor and tighten to **25 Nm**.
11. Align the clamp to the intermediate to header pipe joint and tighten to **15 Nm**.
12. If removed, refit the rear light bracket to the silencer. Tighten the fixings to **12 Nm**.
13. Refit the silencer heatshields. Tighten the fixings to 6 Nm.
14. Position and engage the silencer to the intermediate pipe. Ensure the front of the outer (cosmetic) heatshield is located over the two rubber mounting grommets on the rear subframe.

15. Align the silencer mounting bracket to the frame. Tighten the fixing to **27 Nm**.



1. Silencer mounting bracket fixing

16. Align the clamp to the silencer to exhaust pipe joint and tighten to **15 Nm**.
17. Reconnect the battery, positive (red) lead first.

Caution

Do not install the exhaust system or run the engine without the exhaust heatshields fitted. Components protected by the exhaust heatshields may suffer severe damage or a fire if the motorcycle is operated without the heatshields being fitted.

18. Start the engine and check for exhaust gas leaks. Rectify if necessary.
19. Refit the lower fairings (see page *16-13*).
20. Reconnect the direction indicator and licence plate lamp electrical connector.
21. Refit the rear bodywork (see page *16-12*).
22. Refit the seats (see page *16-11*).

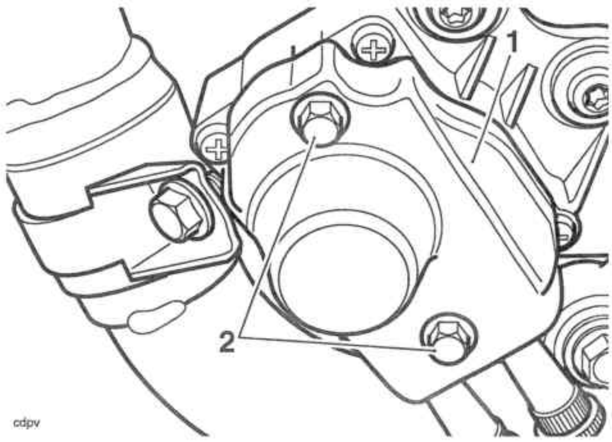
Exhaust Butterfly Valve Actuator

Removal

Warning

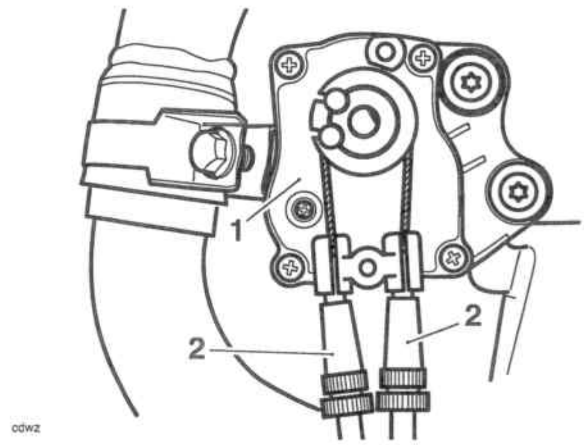
If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the right hand lower fairing (see page *16-13*).
4. Remove the cover from the butterfly valve cables on the actuator.



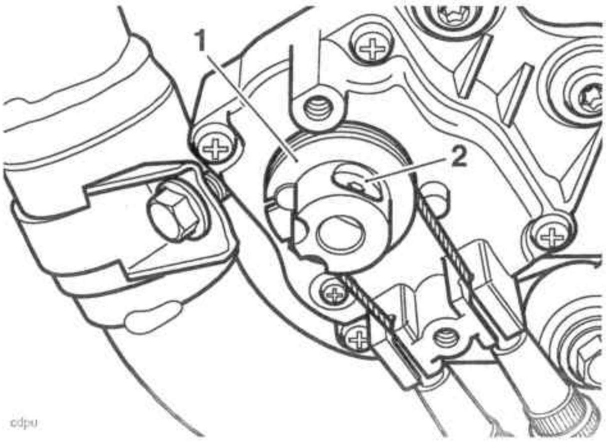
1. Cover
2. Fixings

5. Slacken both cable adjusters at the actuator to give the maximum amount of slack in the cables.



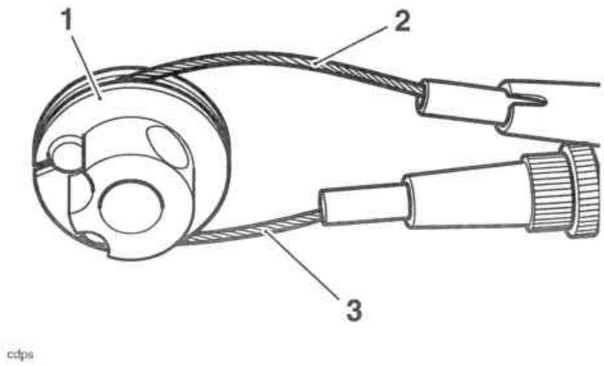
1. Actuator
2. Adjusters

6. Remove and discard the actuator pulley wheel fixing.



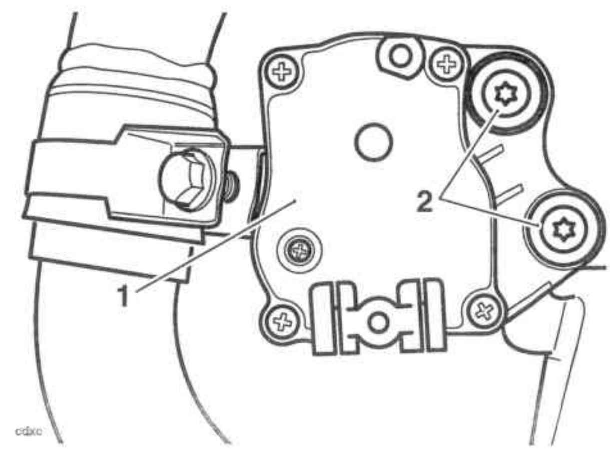
1. Actuator pulley wheel
2. Fixing

7. Slide the actuator pulley off the actuator shaft.
8. Slide the outer portion of the cables out of the actuator.
9. Detach the inner portion of the cables from the actuator pulley wheel.



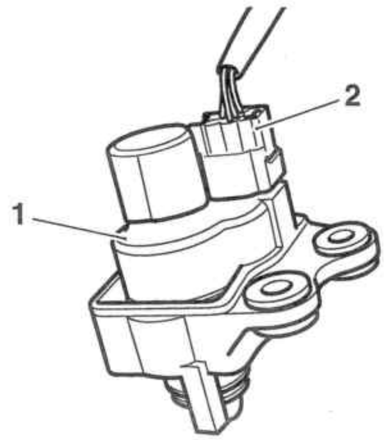
1. Actuator pulley wheel
2. Opening cable
3. Closing cable

10. Release the two fixings and detach the actuator.



1. Actuator
2. Fixings

11. Disconnect the electrical connector and remove the actuator.



1. Actuator
2. Connector

Installation

1. Position the actuator to the motorcycle and connect the electrical connector.
2. Refit the actuator to the frame and tighten the two fixings to **12 Nm**.
3. Connect the butterfly valve control cables and pulley wheel to the actuator (see page *10-136*, from paragraph 3 to paragraph 6).
4. Adjust the butterfly valve control cables (see page *10-137*, from paragraph 6 to paragraph 24).
5. Refit the right hand lower fairing (see page *16-13*).
6. Reconnect the battery, red (positive) lead first.
7. Refit the rider's seat (see page *16-11*).

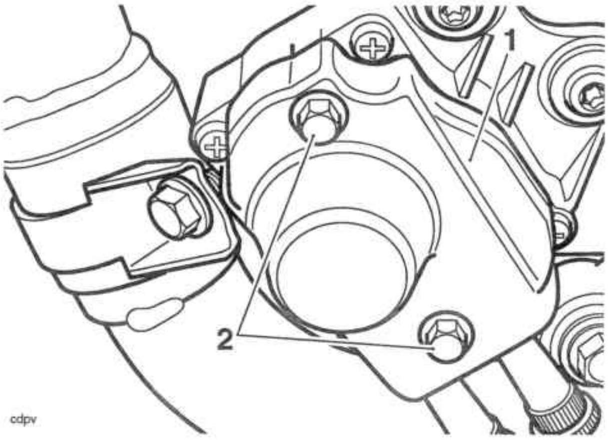
Exhaust Butterfly Valve Cables

Removal

Warning

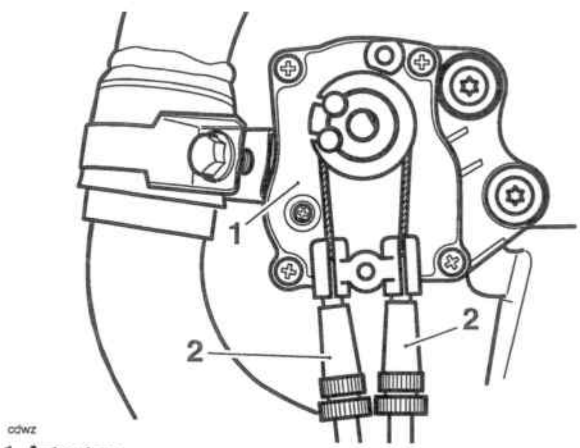
If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the right hand lower fairing (see page *16-13*).
4. Remove the cover from the butterfly valve cables on the actuator.



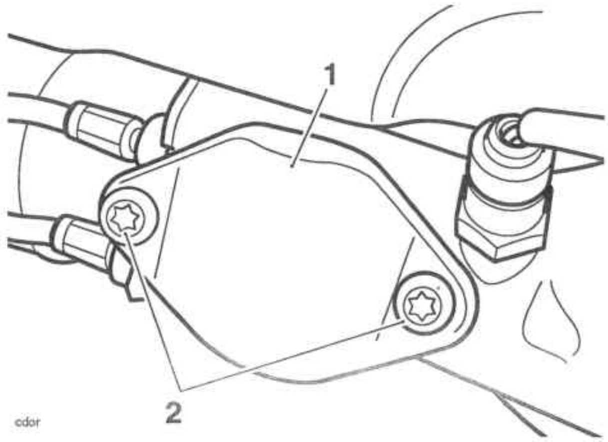
1. Cover
2. Fixings

5. Slacken both cable adjusters at the actuator to give the maximum amount of slack in the cables.



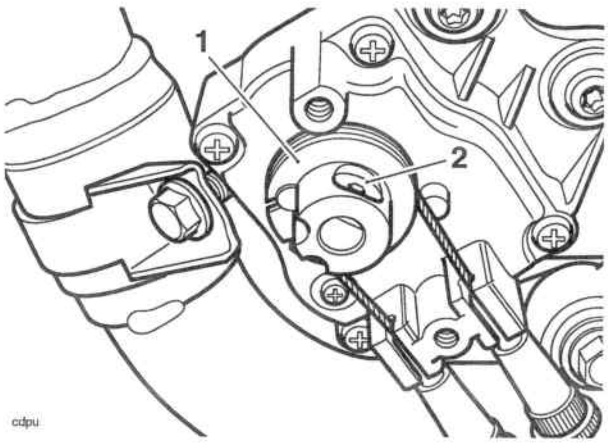
1. Actuator
2. Adjusters

6. Remove the cover from the butterfly valve cables on the exhaust header.



1. Cover
2. Fixings

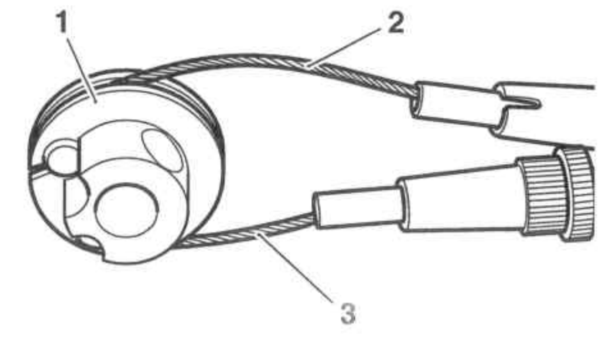
7. Remove and discard the actuator pulley wheel fixing.



1. Actuator pulley wheel
2. Fixing

8. Slide the actuator pulley off the actuator shaft.
9. Slide the outer portion of the cables out of the actuator.

10. Detach the inner portion of the cables from the actuator pulley wheel.



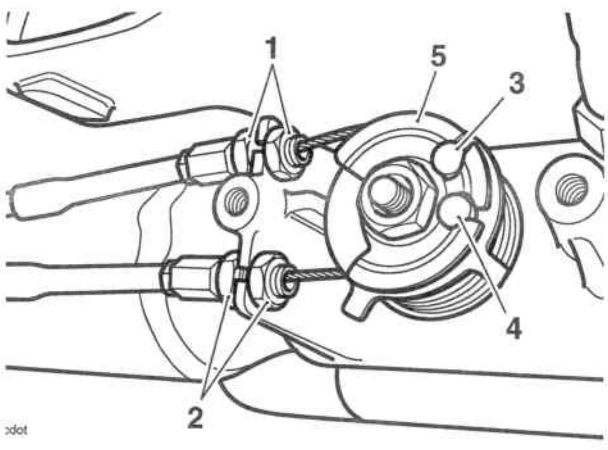
1. Actuator pulley wheel
2. Opening cable
3. Closing cable

11. Slacken the adjuster locknuts at the exhaust valve end of the cables such that they will allow the outer cables to be detached from the exhaust headers.

Note:

- **The adjuster/locknuts are coloured black on the upper, opening cable and silver on the lower, closing cable.**

12. Noting the orientation of the cables, detach the inner cable nipples from the exhaust valve pulley wheel and remove the cables.



1. Opening cable adjuster/locknuts
2. Closing cable adjuster/locknuts
3. Opening cable nipple
4. Closing cable nipple
5. Exhaust valve pulley wheel

Inspection

1. Check that both the exhaust valve cables operate smoothly, without sticking or binding. Replace the cables if there is any doubt as to their correct operation.

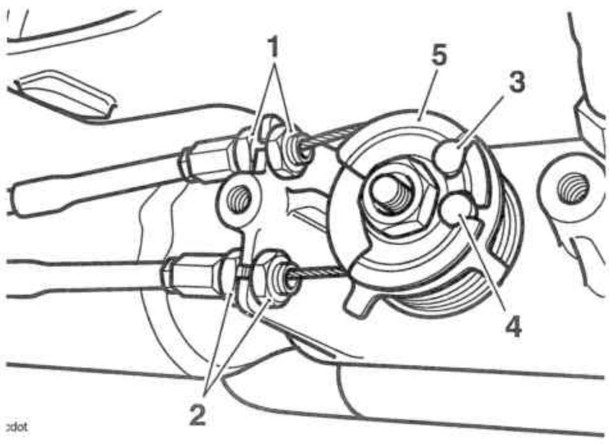
Installation

1. Insert the cable threaded ends into the exhaust headers as noted on removal, ensuring the adjuster/locknuts are positioned one on either side of the cable retainer casting on the exhaust header. Do not tighten the adjuster/locknuts at this stage.

Note:

- **For identification, the adjuster/locknuts are coloured black on the upper, opening cable and silver on the lower, closing cable.**

2. Fit the cable nipples into the exhaust valve pulley wheel.

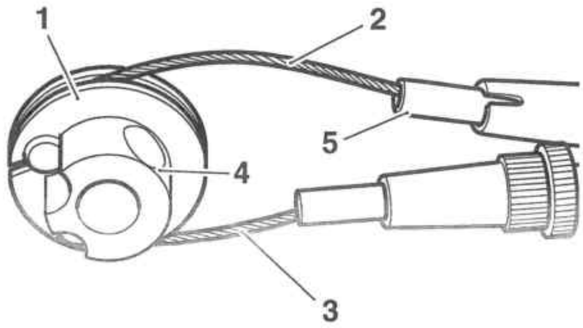


1. Opening cable adjuster/locknuts
2. Closing cable adjuster/locknuts
3. Opening cable nipple
4. Closing cable nipple
5. Exhaust valve pulley wheel

Note:

- **Where the outer cables locate into the actuator, the cable outer sleeve is coloured black on the upper, opening cable and silver on the lower, closing cable.**

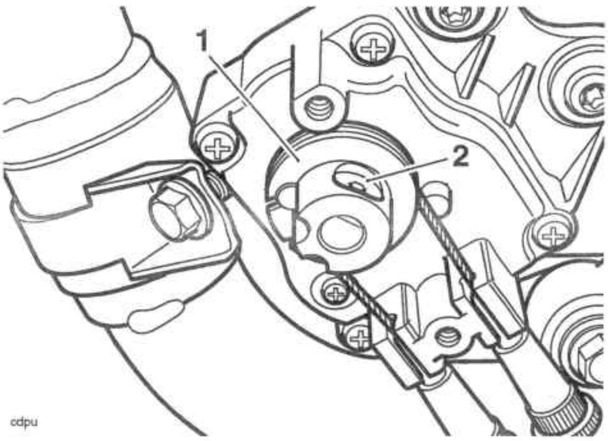
3. Fit the inner portion of the cables to the actuator pulley wheel, ensuring the pulley wheel is installed with the fixing boss facing outwards, and the opening (black) cable uppermost.



cdps

1. Actuator pulley wheel (fixing boss facing outwards)
2. Opening cable
3. Closing cable
4. Fixing boss
5. Black coating on cable outer

4. Insert the outer portion of the cables into the actuator.
5. Slide the actuator pulley onto the actuator shaft.
6. Install a new actuator pulley wheel fixing and tighten to **5 Nm**.



cdpu

1. Actuator pulley wheel
2. Fixing

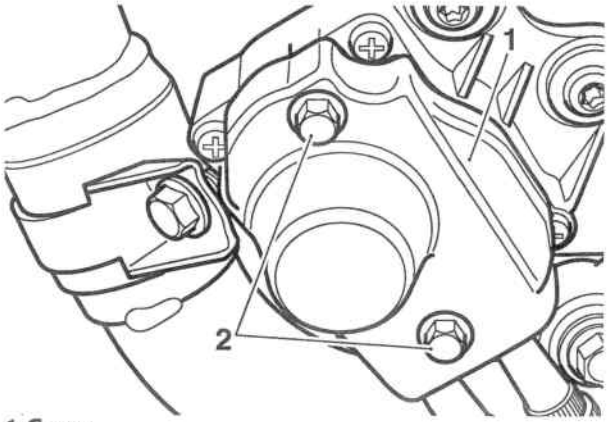
7. Adjust the exhaust valve cables (see page *10-137*).
8. Refit the right hand lower fairing (see page *16-13*).
9. Reconnect the battery, red (positive) lead first.
10. Refit the rider's seat (see page *16-11*).

Exhaust Butterfly Valve Cable Adjustment

Warning

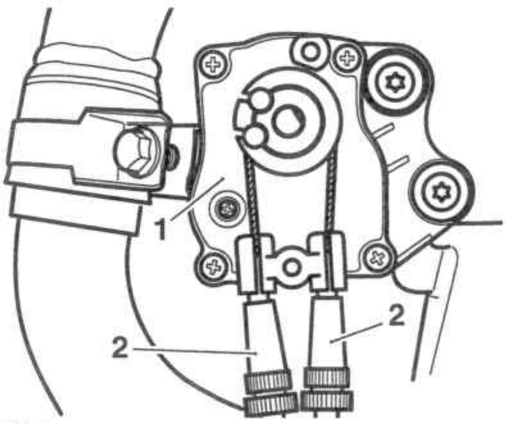
If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the right hand lower fairing (see page *16-13*).
4. Remove the cover from the butterfly valve cables on the actuator.



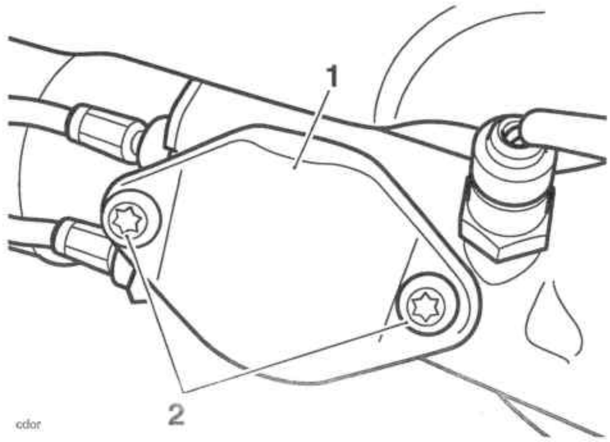
1. Cover
2. Fixings

5. Slacken both cable adjusters at the actuator to give the maximum amount of slack in the cables.



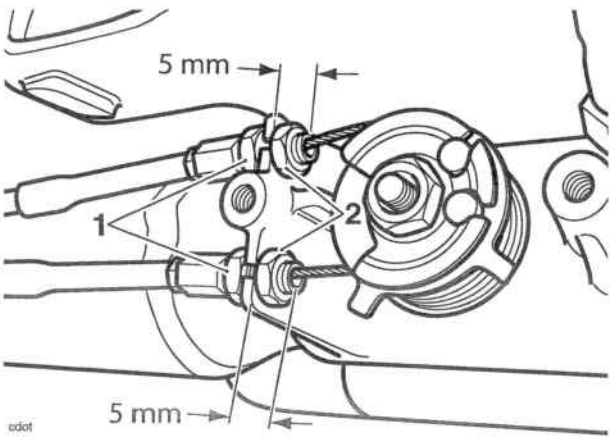
1. Actuator
2. Adjusters

6. Remove the cover from the butterfly valve cables on the exhaust header.



1. Cover
2. Fixings

7. Slacken the butterfly valve cable locknuts and, using the adjuster nuts, set the distance between the end of the cables and the cable retainer casting on the exhaust header to 5 mm. Tighten the locknuts to **5 Nm**.



1. Locknuts
2. Adjuster nuts

8. Reconnect the battery, red (positive) lead first.
9. Attach the Triumph diagnostic tool to the dedicated plug (see page *10-38*).
10. Turn the ignition to the 'ON' position.
11. On the diagnostic tool navigate to and select the 'ADJUST TUNE' option.

Warning

Pressing the validation key will cause the exhaust valve actuator to move to the adjustment position. To prevent injury, never place loose clothing, fingers or hands near the exhaust valve actuator, cables or the valve on the header pipe, until the actuator has moved to the adjustment position. Loose clothing, fingers or the hands could become trapped during valve/actuator movement and cause crushing injury to the fingers, hands or other parts of the anatomy.

12. At the next screen, align the cursor with 'EXBV ADJUST' (see below) then press the validation key which is marked '*'.

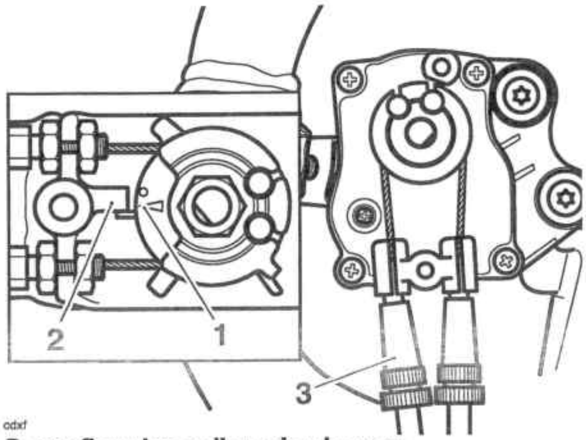
									A	D	J	U	S	T		T	U	N	E
	B	A	L	A	N	C	E		T	H	R	O	T	T	L	E	S		
▶	E	X	B	V		A	D	J	U	S	T								

13. On pressing the validation key, the diagnostic tool will send a command, which drives the exhaust valve actuator to the middle position, and the diagnostic tool will show the screen below.

									E	X	B	V		A	D	J	U	S	T
		A	D	J	U	S	T		/		R	E	P	L	A	C	E		
				C	A	B	L	E	S		T	H	E	N					
	P	R	E	S	S		*		T	O		C	O	N	T	I	N	U	E

14. The exhaust butterfly cables can now be adjusted as follows overleaf:

15. Turn the adjuster shown in the illustration below until the butterfly valve pulley wheel arrow is level with the lower edge of the butterfly valve 'stop' casting.

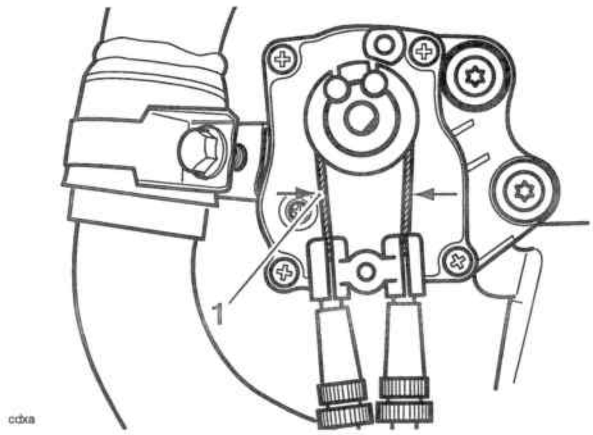


1. Butterfly valve pulley wheel arrow
2. Butterfly valve 'stop' casting
3. Adjuster

16.

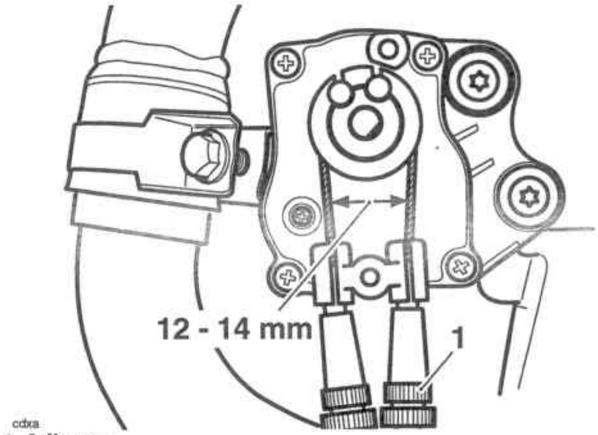
17. Turn the adjuster shown in the illustration below to remove the slack from the cables. Measure the cable slack as follows:

- Using light finger pressure, squeeze the cables together at the position shown below.



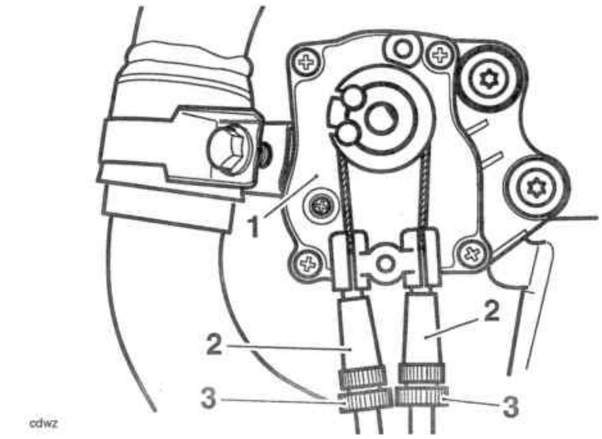
1. Cable slack measurement position

- Whilst maintaining light finger pressure, measure the distance between the two cables.
- When the cable slack is correct, the distance between the two cables should be 12 - 14 mm.



1. Adjuster
2. Correct setting, 12-14 mm

18. Tighten the cable adjuster locknuts.



1. Actuator
2. Adjusters
3. Locknuts

Warning

Pressing the validation key will cause the exhaust valve actuator to move to the closed position and then the fully open position. To prevent injury, never place loose clothing, fingers or hands near the exhaust valve actuator, cables or the valve on the header pipe, until the actuator has stopped. Loose clothing, fingers or the hands could become trapped during valve/actuator movement and cause crushing injury to the fingers, hands or other parts of the anatomy.

19. On the diagnostic tool, press the validation key marked '*' to return the actuator to normal control and return the diagnostic tool to the ADJUST TUNE menu.

									E	X	B	V		A	D	J	U	S	T
	P	R	O	C	E	D	U	R	E		C	O	M	P	L	E	T	E	?
		P	R	E	S	S		*		T	O		E	X	I	T			

Note:

- **If the cable adjustment procedure has been correctly carried out, the exhaust valve will now be in the closed position.**
- **If the adjustment is not correct, the exhaust valve will be set in the open position and the Malfunction Indicator Light (MIL) will be illuminated, indicating the presence of DTCs (Diagnostic Trouble Codes).**

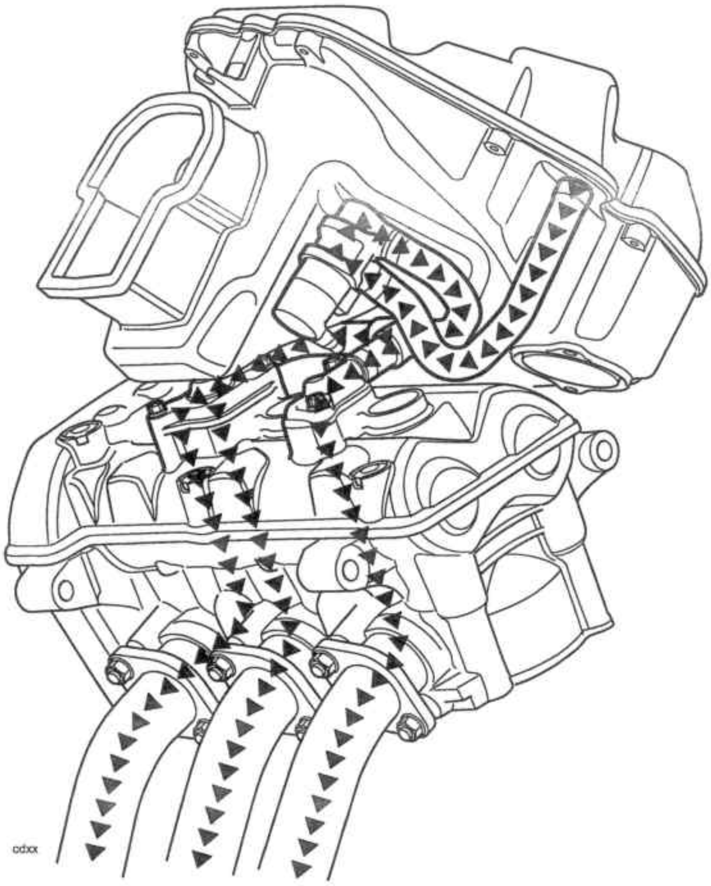
- **The following screen will be displayed:**

									E	X	B	V		A	D	J	U	S	T
				D	T	C	S		P	R	E	S	E	N	T				
		P	R	E	S	S		*		T	O		C	H	E	C	K		

20. Rectify the DTCs as necessary by repeating the adjustment procedure.
21. On the diagnostic tool, scroll to the 'DIAGNOSTICS' menu and select 'READ STORED DTCS' see (PAGE *10-44*). Re-check for any stored DTCs and rectify as necessary.
22. Turn the ignition to the 'OFF' position
23. Disconnect the Triumph diagnostic tool.
24. Refit the cover to the butterfly valve cables on the actuator. Tighten the fixings to **2 Nm**.
25. Refit the cover to the butterfly valve cables on the exhaust header. Tighten the fixings to **12 Nm**.
26. Refit the right hand lower fairing (see page *16-13*).
27. Refit the rider's seat (see page *16-11*).

Secondary Air Injection

System Purpose and Operation



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.

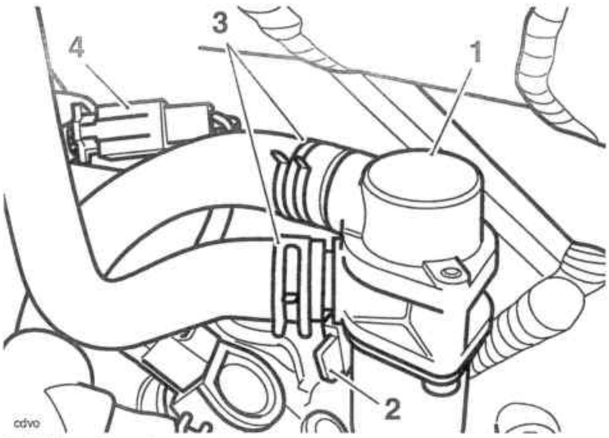
At certain specific engine speeds (determined by the factory programming of engine management system), the secondary air injection control valve is opened by the ECM and allows an air feed into the secondary air system where, each time a pair of exhaust valves open, the exhaust gases in the exhaust port 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 control 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.

At other engine speeds, the system is disabled by closing the control valve in the system. This allows an oxygen sensor to control air to fuel ratios. If air was fed to the exhaust system when the oxygen sensor was operational, the incoming air would cause inaccuracies in the readings sensed by the oxygen sensor (which requires access to 'raw' combustion gases) which would lead to rough running.

Secondary Air Injection Solenoid Valve

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Release the hoses attached to the valve.
6. Disconnect the multi-plug.



1. Solenoid valve
2. Retainer
3. Spring hose clips
4. Multiplug

7. Gently pull the valve to detach from the retainer.

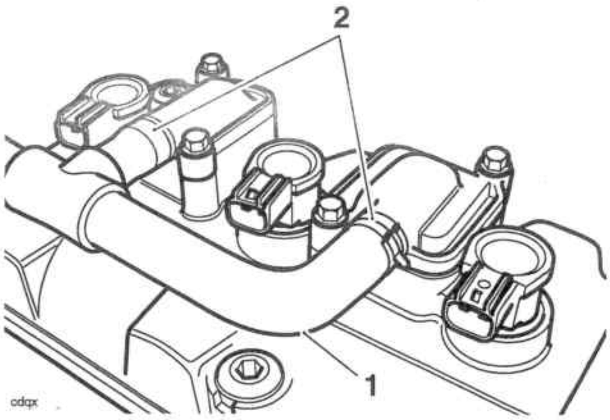
Installation

1. Refit the hoses to the valve.
2. Locate the valve to the retainer.
3. Reconnect the multi-plug.
4. Refit the airbox (see page *10-111*).
5. Refit the fuel tank (see page *10-106*).
6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (see page *16-11*).

Secondary Air Injection Reed Valves

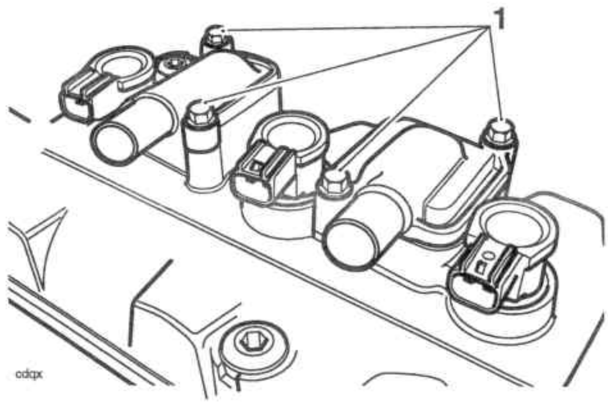
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (see page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Detach the secondary air injection feed hoses from the reed valves on the cam cover.



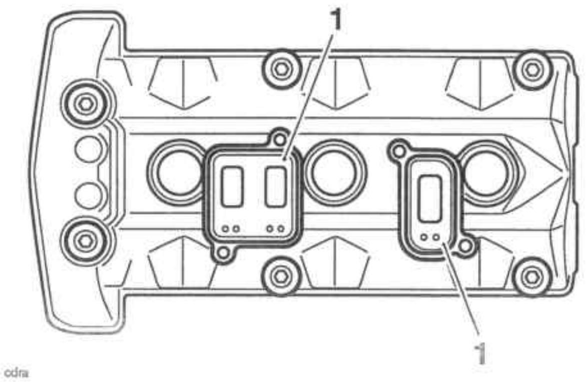
1. Secondary air injection hose
2. Spring-close clip

6. Release the bolts securing the valve covers to the cam cover.
7. Ease the valve covers from the valves.



1. Valves

8. Detach the valves from the cam cover.



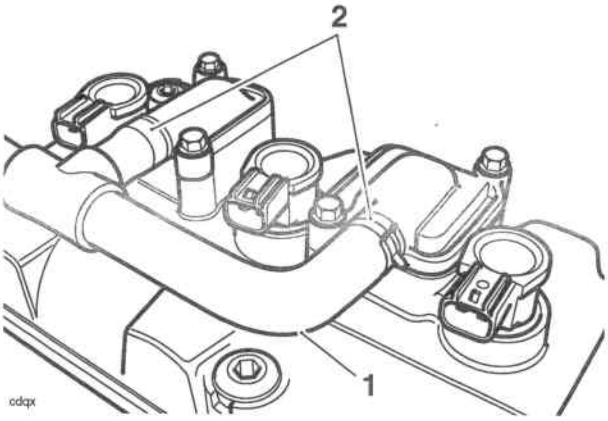
1. Reed valves

Inspection

1. Check for cracks, bending or other damage to the valve flaps. Replace as necessary.
2. Check for damage to the seal areas. Replace as necessary.
3. Check the valve body to cylinder head seal for damage.

Installation

1. Fit the reed valves to the cam cover.
2. Refit the valve covers and tighten the fixings to **9 Nm**.
3. Refit the secondary air injection feed hoses to the reed valves.



1. Secondary air injection hose
2. Spring-close hose clip

4. Refit the airbox (see page *10-111*).
5. Refit the fuel tank (see page *10-106*).
6. Reconnect the battery, positive (red) lead first
7. Refit the rider's seat (see page *16-11*).

Evaporative Emissions Control System

California Models Only

All California models are fitted with a system to control the evaporation of fuel vapour to the atmosphere.

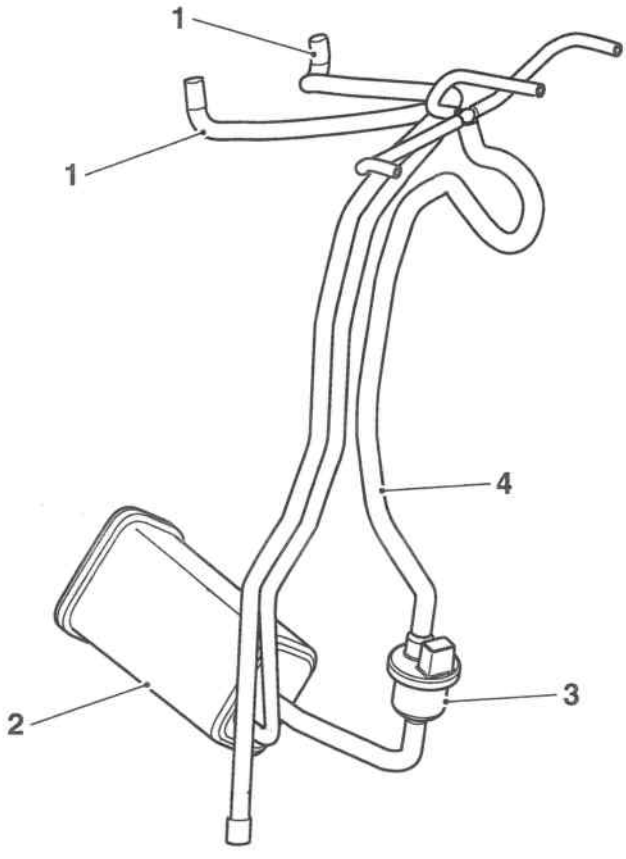
A carbon filled canister absorbs vapour while the engine is not running. When the engine is started, the vapour is returned to the engine and burnt.

There are two distinct phases to the system's operation, engine off and engine running. These two conditions are explained overleaf.

Component Locations

Carbon Filled Canister (2) - behind the left hand lower fairing, below the swinging arm.

Purge Control Valve (3)- adjacent to frame, left hand side (electronically controlled by the ECM)

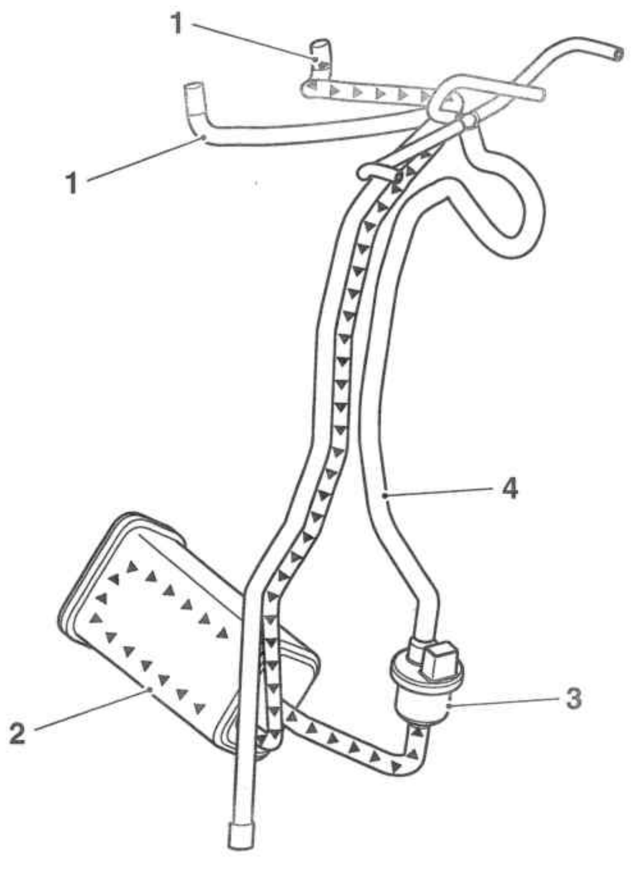


1. Breather hoses
2. Carbon filled canister
3. Purge valve
4. Purge hose to throttle bodies

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 hose (1) to a carbon filled canister (2) which stores the vapour.

Once in the canister, vapour cannot enter the engine because the purge valve is closed.



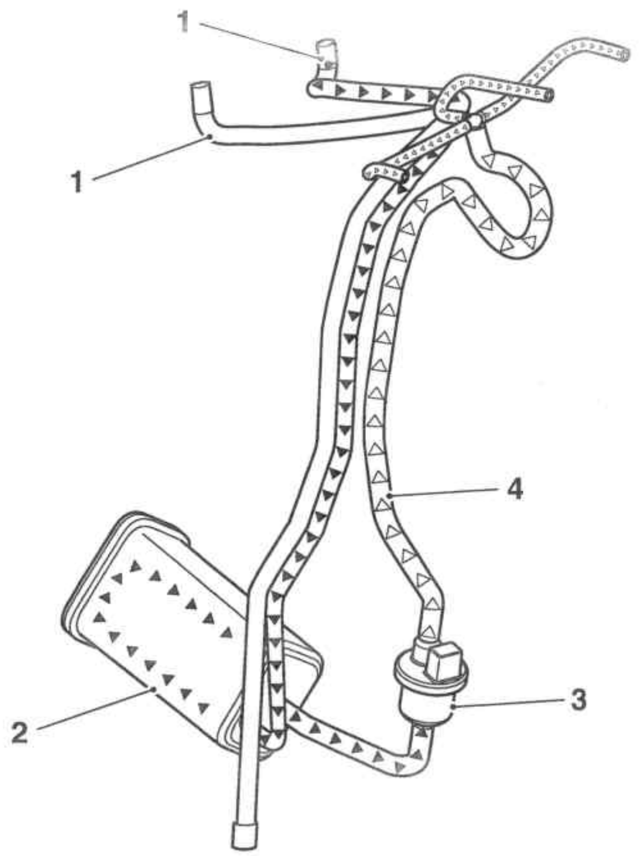
1. Breather hoses
2. Carbon filled canister
3. Purge valve (closed)
4. Purge hose to throttle bodies

Evaporative Control System - Engine Running

When the engine is running, engine vacuum is applied to the purge hose (4) from the throttle bodies.

At certain times, the ECM opens the purge valve. The vacuum applied to the purge hose (4) now begins to draw stored vapour from the carbon filled area of the canister 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 shuttles the purge control valve between open and closed positions.



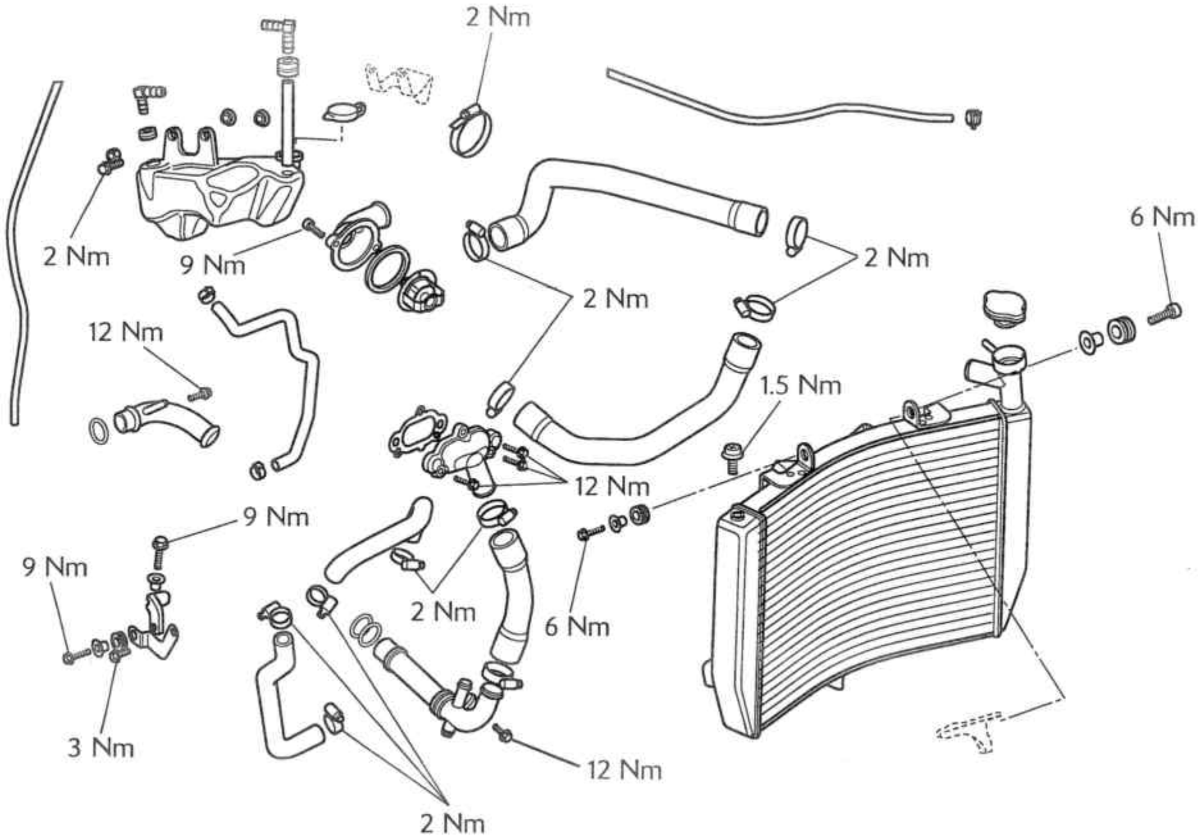
1. Breather hoses
2. Carbon filled canister
3. Purge valve (open under ECM control)
4. Purge hose to throttle bodies

11 Cooling

Table of Contents

Cooling

Exploded View - Cooling System



Coolant

A permanent type of anti-freeze is installed in the cooling system when the motorcycle leaves the factory.

It is coloured blue, contains a 50% solution of ethylene glycol, and has a freezing point of -35°C (-15°F).

Always change the coolant at the intervals specified in the scheduled maintenance chart.

Warning

Coolant mixture that contains anti-freeze and corrosion inhibitors contains toxic chemicals which are harmful to the human body. Never swallow anti-freeze or any of the motorcycle coolant.

Caution

The coolant anti-freeze contains a corrosion inhibitor which helps prevent damage to the metal surfaces inside the cooling system. Without this inhibitor, the coolant would 'attack' the metals and the resulting corrosion would cause blockages in the cooling system leading to engine overheating and damage. Always use the correct anti-freeze as specified in the owner's handbook. Never use a methanol based anti-freeze as this does not contain the required corrosion inhibition properties.

Caution

Distilled water must be used with the anti-freeze (see specification for anti-freeze) in the cooling system.

If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system. Reduced cooling system efficiency may cause the engine to overheat and suffer severe damage.

Radiator Hoses

Regularly check all radiator hoses and hose clips for cracks, leaks or deterioration in accordance with the scheduled maintenance chart.

Radiator and Cooling Fan

Check the radiator fins for obstruction by insects, mud, leaves and general debris. Clean off any obstructions by hand or with a stream of low pressure water.

Warning

The cooling fan operates automatically. To prevent injury, keep hands and clothing away from the fan blades at all times.

Caution

Using high-pressure water sprays can damage the radiator fins and impair the radiator's efficiency.

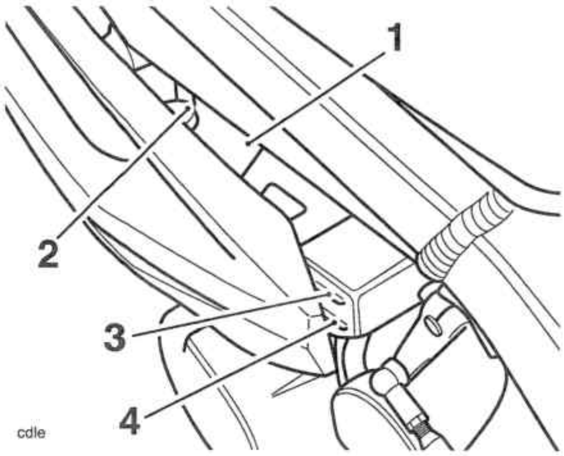
Do not obstruct or deflect airflow through the radiator by installing unauthorized accessories in front of the radiator or behind the cooling fan. Interference with the radiator airflow can lead to overheating and consequent engine damage.

Coolant Level Inspection

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

1. Position the motorcycle on level ground and in an upright position.
2. The expansion tank can be viewed from the left hand of the motorcycle, between the rear of the lower fairing and the frame. The coolant level should be between the 'MAX and 'MIN.' marks.



1. Expansion tank
2. Expansion tank filler cap
3. 'MAX' mark
4. 'MIN.' mark

3. If the level of coolant is low, remove the cap from the expansion tank and add coolant mixture as necessary to bring the level up to the 'MAX' mark. Refit the cap.

Caution

If the coolant level is found to be low, or if coolant has to be added regularly, inspect the cooling system for coolant leaks. If necessary, pressure test the system to locate the source of the leak and rectify as necessary. Loss of coolant may cause the engine to overheat and suffer severe damage.

Coolant Replacement

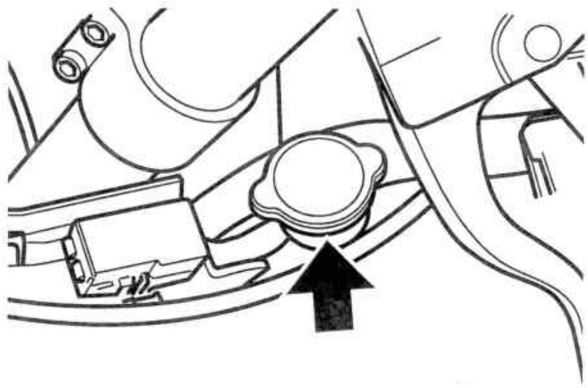
Drainage

1. Position the motorcycle on level ground on the sidestand.
2. Remove the rider's seat (see page *16-11*).
3. Disconnect the battery, negative (black) lead first.

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

4. Remove the lower fairings (see page *16-13*).
5. Remove the coolant pressure cap on the radiator.

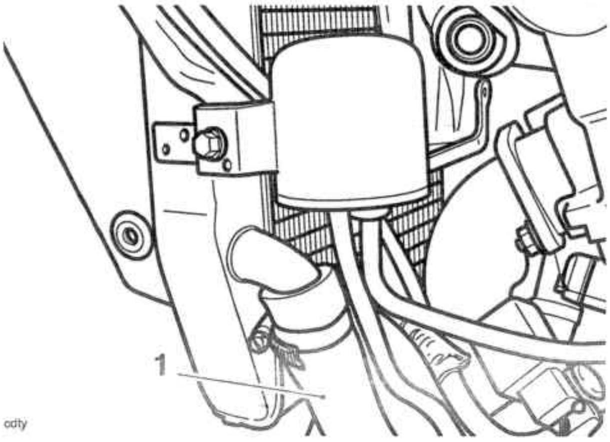


cdmm

Radiator cap

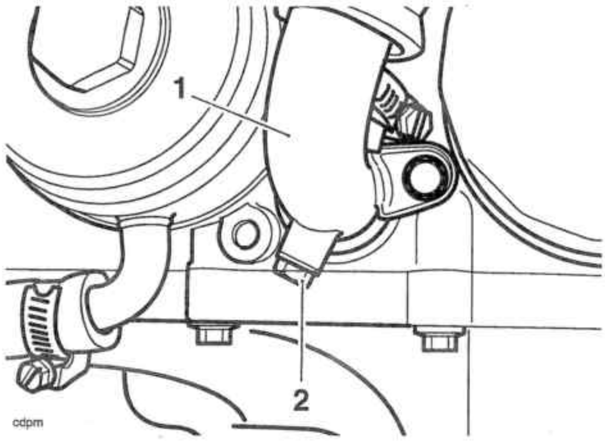
6. Position a container to collect the displaced coolant.

7. Slacken the clip then release the bottom hose from the radiator and allow the coolant to drain.



1. Bottom hose

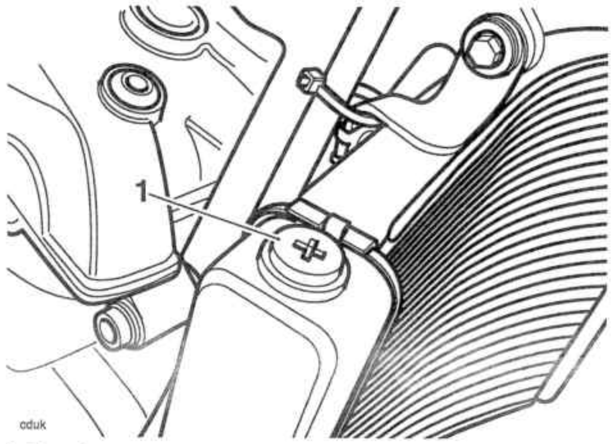
8. Remove the drain bolt from the coolant outlet tube, located next to the heat exchanger and allow the coolant to drain. Discard the sealing washer.



1. Coolant outlet tube
2. Drain bolt

Filling

9. Incorporating a new sealing washer, refit the drain bolt to the coolant outlet tube and tighten to **9 Nm**.
10. Reconnect the bottom hose and tighten the hose clip.
11. Remove the bleed screw from the left hand side of the radiator.



1. Bleed screw

12. Slowly add coolant mixture to the system, through the filler opening in the radiator, until the system is full. If the system has filled correctly and fully, there should be coolant visible through the bleed screw opening as well as in the filler opening.
13. If there is no coolant visible through the bleed screw opening, but the filler side appears to be full, attach a length of clear tubing to the bleed screw spigot and syphon coolant into the bleed screw side of the radiator.

Note:

- **A hand operated vacuum pump or similar should be used to syphon the coolant through the system.**

14. If necessary, top up the system through the filler and refit the pressure cap.
15. Fit and tighten the bleed screw to **1.5 Nm**.
16. Refit the coolant pressure cap.
17. With the aid of an assistant, lean the motorcycle fully over to the right hand side, and then the left hand side, to release air trapped in the cooling system.
18. Reconnect the battery, positive (red) lead first.
19. Start the motorcycle. Briefly raise the engine speed several times to allow any air to be expelled from the system.
20. Allow the engine to run until the cooling fan operates.
21. Stop the motorcycle and allow the engine to cool.

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the cooling system is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

22. Check and top up the coolant level as necessary.
23. Fit the coolant pressure cap.
24. Check the expansion tank level and top up if necessary.
25. Refit the rider's seat (see page *16-11*).
26. Refit the lower fairings (see page *16-14*).

Water Pump

Note:

- **The oil pump and water pump are supplied as an assembly and cannot be separated. For additional information, refer to Oil Pump (see page *8-8* for removal and page *8-12* for installation).**

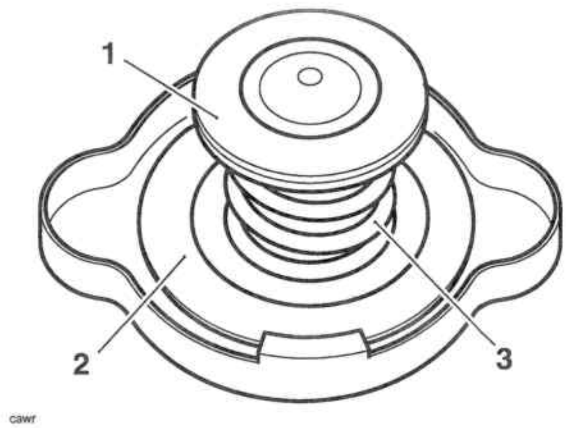
Coolant Pressure Cap

Inspection

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

1. Check the condition of the upper and lower seals of the coolant pressure cap.



1. Lower seal
2. Upper seal
3. Spring

Note:

- **If there is any sign of damage or deterioration replace the cap.**

2. Pressure test the cap to the blow off pressure of 1.1 bar. If the cap opens at a lower pressure or fails to open at 1.1 bar, replace the cap.

Thermostat

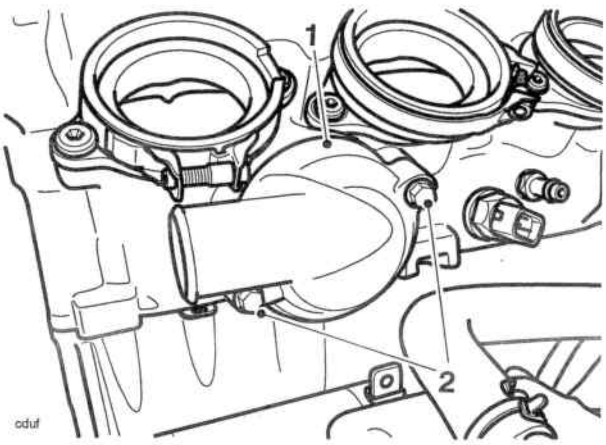
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Drain the coolant (see page *11-4*).
4. Remove the fuel tank (see page *10-105*).
5. Remove the airbox (see page *10-110*).
6. Remove the throttle bodies (see page *10-119*).

Warning

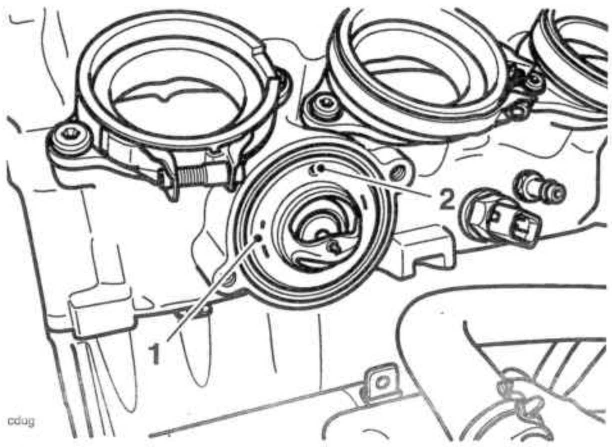
Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

7. Detach the top hose from the thermostat elbow.
8. Release the fixings securing the thermostat elbow to the cylinder head.
9. Remove the thermostat housing. Discard the O-ring.



1. Thermostat housing
2. Fixings

10. Remove the thermostat from the cylinder head.



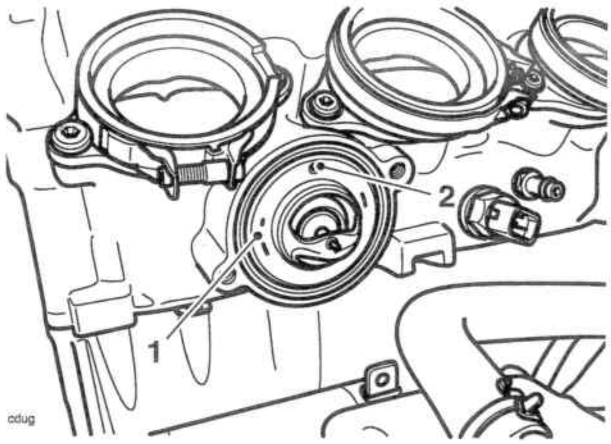
1. Thermostat
2. Bleed valve

Inspection

1. Inspect the thermostat at room temperature. If the valve is open, the thermostat must be replaced.
2. To check the valve opening temperature, suspend the thermostat in a container of water and raise the temperature of the water until the thermostat opens. The thermostat should start to open at 71°C +/- 5°C.
3. If the temperature at which thermostat opening takes place is incorrect, replace the thermostat.

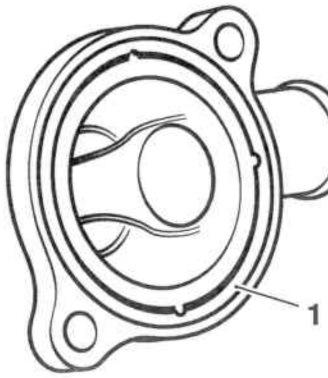
Installation

1. Locate the thermostat into the cylinder head. Ensure the bleed valve is uppermost as shown below.



1. Thermostat
2. Bleed valve

2. Fit a new O-ring to the thermostat elbow.



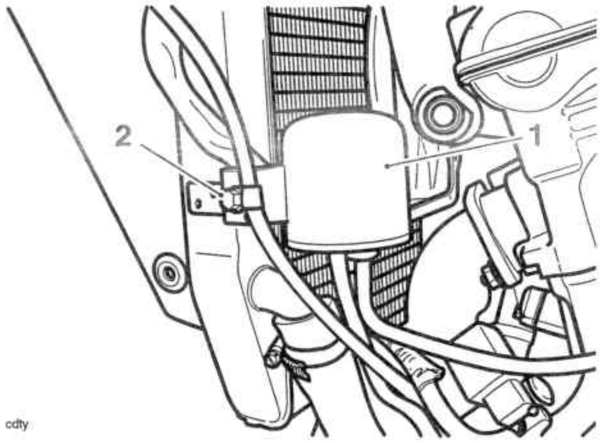
1. O-ring/groove

3. Tighten the fixings to **12 Nm**.
4. Reconnect the top hose and tighten the clip.
5. Refit the throttle bodies (see page *10-120*).
6. Refit the airbox (see page *10-111*).
7. Refit the fuel tank (see page *10-106*).
8. Reconnect the battery positive (red) lead first.
9. Refit the rider's seat (se page *16-11*).
10. Refill the cooling system (see page *11-5*).

Radiator

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the lower fairings (see page *16-13*).
4. Detach the vacuum reservoir and hose from the radiator and position aside.



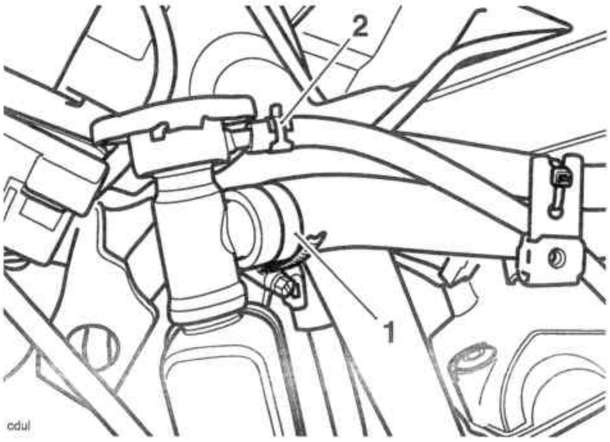
1. Vacuum reservoir
2. Fixing

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

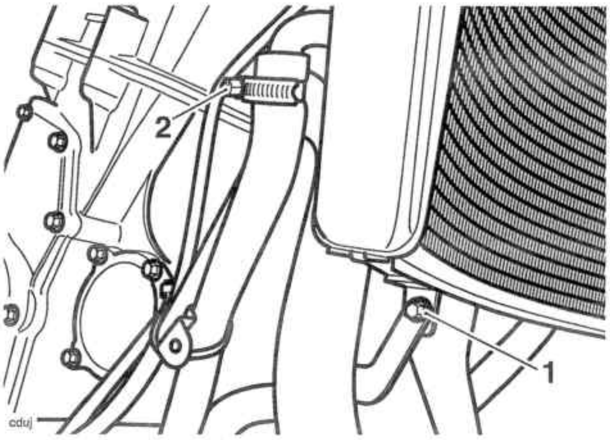
5. Drain the coolant (see page *11-4*).

6. Disconnect the top hose and bypass hose at the radiator.



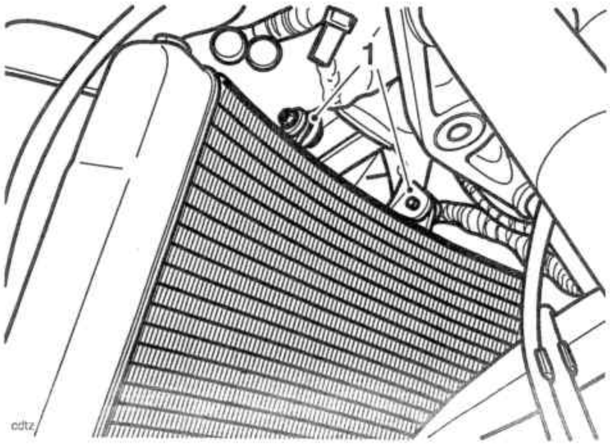
1. Top hose
2. Bypass hose

7. Disconnect the heat exchanger hose from the radiator.
8. Release the radiator lower mounting.



1. Radiator lower mount fixing
2. Heat exchanger hose

9. Disconnect the cooling fan connection from above the cam cover.
10. Release the bolts securing the radiator to the frame.



1. Radiator to frame bolts

11. Remove the radiator.

Inspection

1. Check the radiator for stone damage.
2. Check the radiator core for damage to the fins or obstructions to air flow.
3. Repair any damage and clear all obstructions.

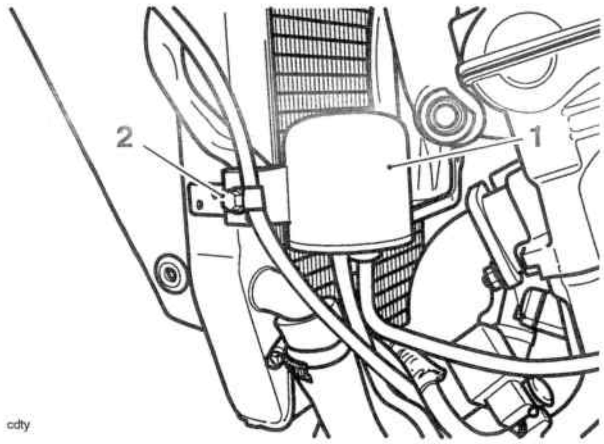
Caution

To avoid overheating and consequent engine damage, replace the radiator if the cores are blocked or if the fins are badly deformed or broken.

4. Check that the fan spins freely and without tight spots.
5. Check the fan blades for signs of heat distortion.

Installation

1. Align the radiator to the frame and lower mounting. Fit and tighten the upper mounting bolts to **9 Nm**.
2. Fit and tighten the lower mounting bolt to **9 Nm**.
3. Reconnect the cooling fan.
4. Reconnect the bypass, heat exchanger, top and bottom hoses. Tighten the hose clips.
5. Refit the vacuum reservoir and hose to the radiator and tighten the fixing to **6 Nm**.



1. Vacuum reservoir
2. Fixing

6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (se page *16-11*).
8. Refit the lower fairings (see page *16-14*).
9. Refill the cooling system (see page *11-5*).

12 Rear Suspension

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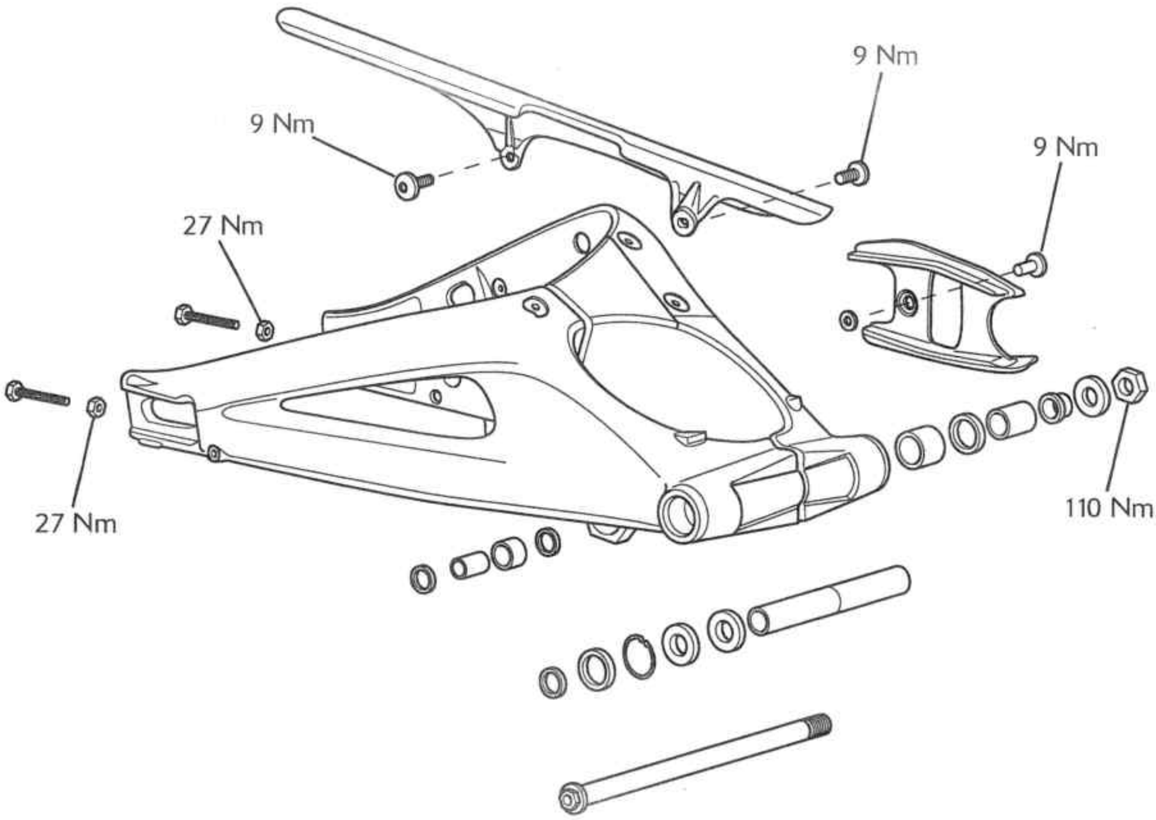
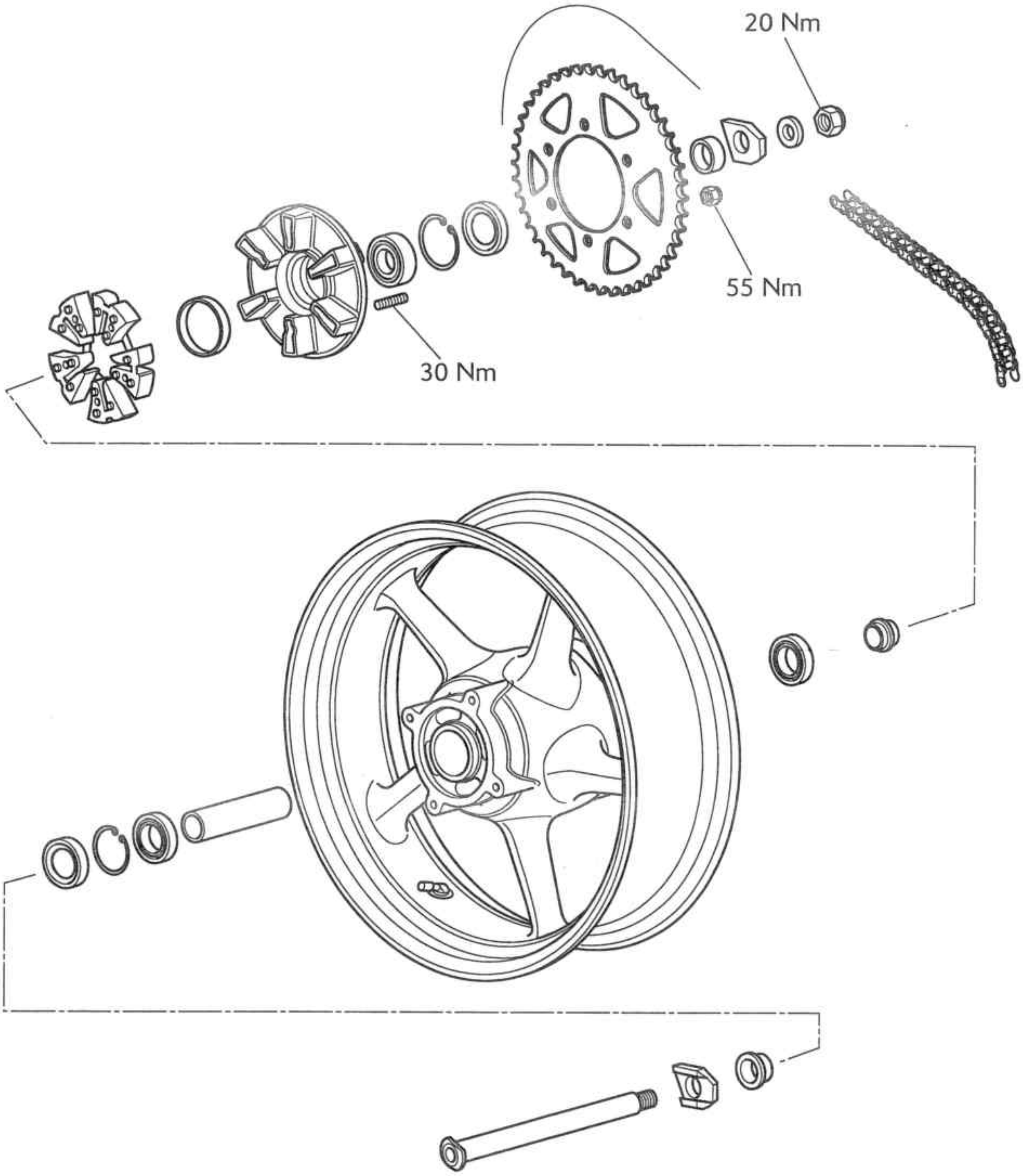
Rear Suspension

Exploded View - Swinging Arm

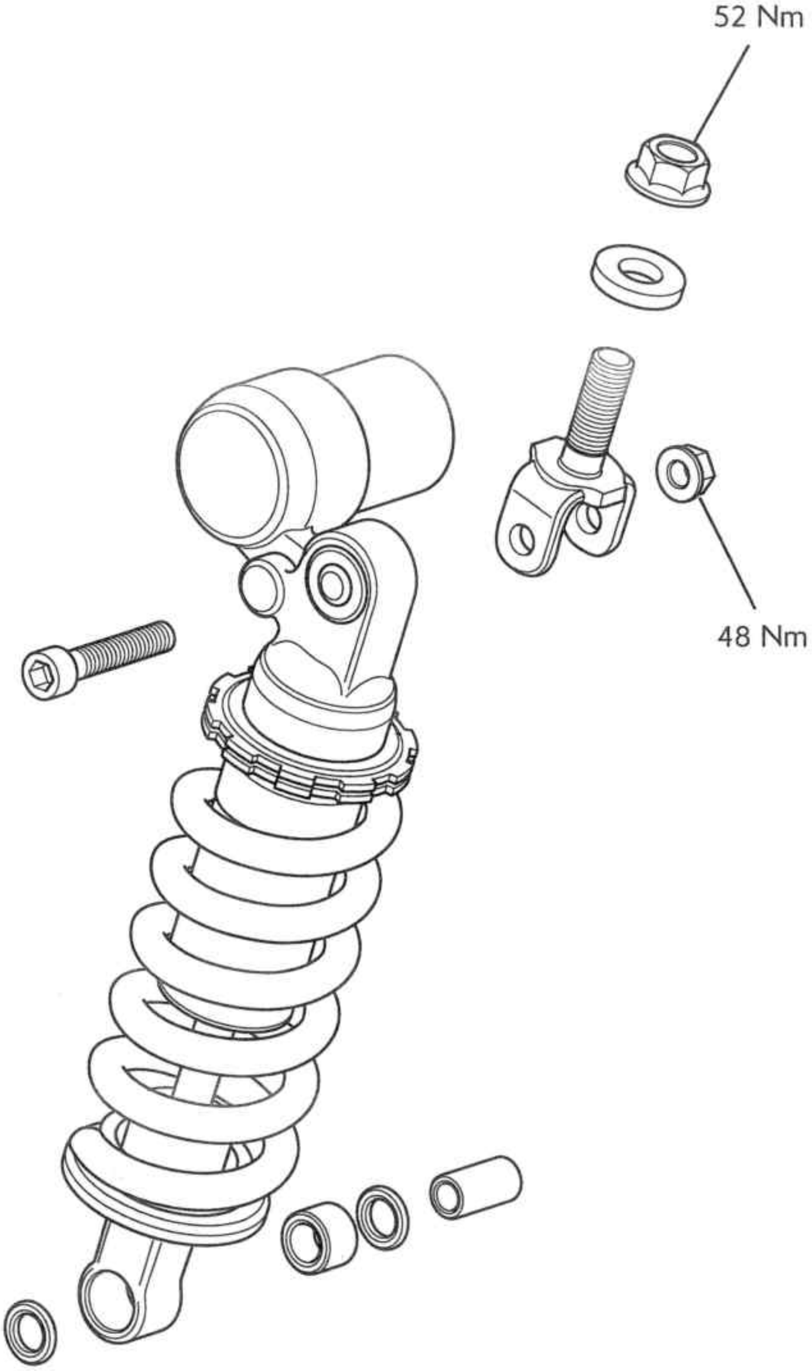


Exploded View - Rear Hub and Wheel

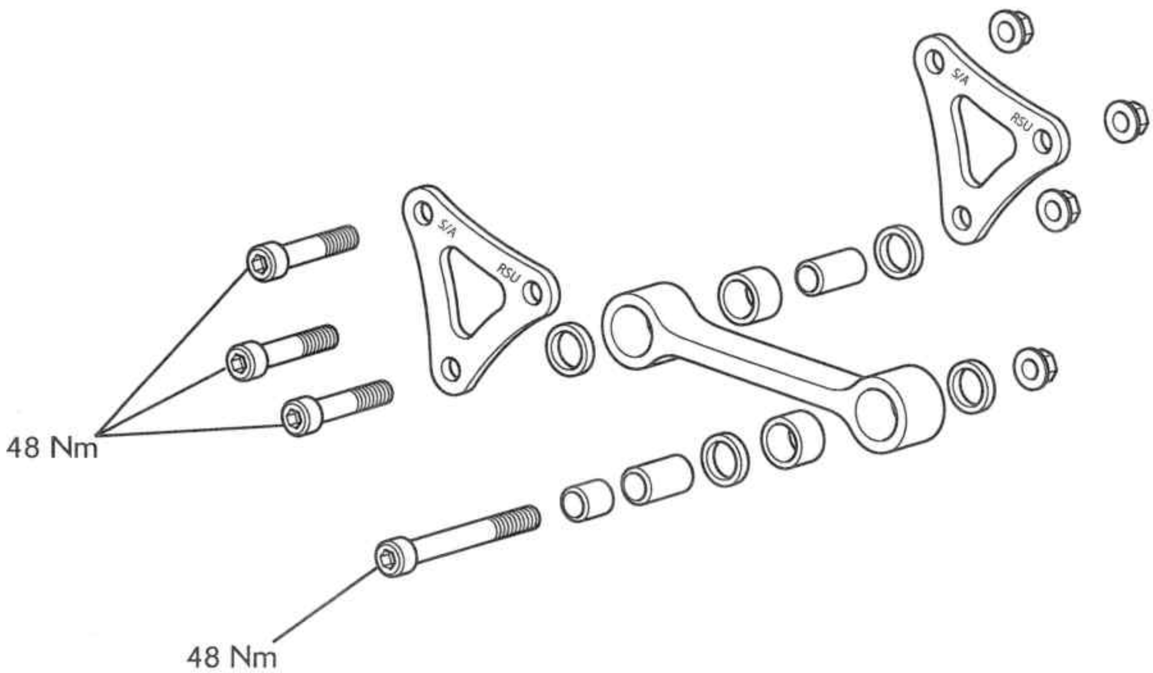


Rear Suspension

Exploded View - Rear Suspension Unit



Exploded View - Drop/Drag Link



Drive Chain

For safety and to prevent excessive wear, the drive chain must be checked, adjusted and lubricated in accordance with scheduled maintenance requirements. Checking, adjustment and lubrication must be carried out more frequently for extreme conditions such as salty or heavily gritted roads.

If the chain is badly worn or incorrectly adjusted (either too loose or too tight) the chain could jump off the sprockets or break.

Warning

A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing an accident. Never neglect chain maintenance.

Note:

- **Lubrication of the drive chain should ideally be carried out with the motorcycle set up so that the rear suspension hangs free.**
- **The chain must be adjusted with the motorcycle in an upright position, resting on its wheels, and with no additional weight it.**

Chain Lubrication

Lubrication is necessary every 200 miles and also after riding in wet weather, on wet roads, or any time that the chain appears dry.

Use the special chain lubricant as recommended in the specification section.

Correct application is critical for chain lubrication. Apply the lubricant for one full chain revolution only, then leave for eight hours before riding. This allows the lubricant's solvent (used to thin the oil) to evaporate and the oil to 'soak' into all parts of the chain. If the lubricant is applied and the motorcycle is ridden shortly afterwards, the lubricant is unlikely to reach all parts and the majority will be flung off and wasted. Applying excessive amounts is not helpful under any circumstances.

It should be noted that the lubricant is applied to the chain to lubricate its action across the sprockets. In an O-ring chain, external lubrication does not penetrate to the bushes and rollers as the O-ring seals prevents this from happening.

Caution

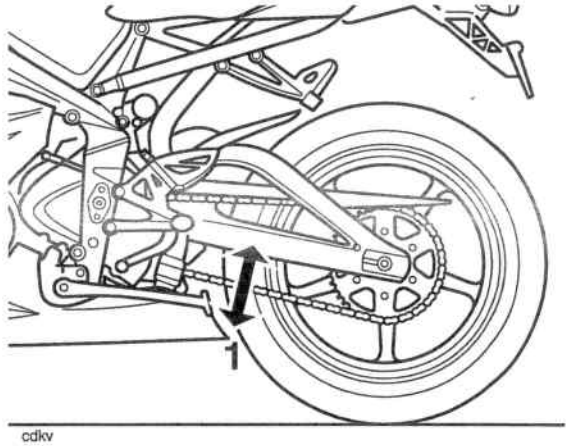
Do not use a power 'jet' wash to clean the chain as this may cause damage to the chain components.

Chain Adjustment

Note:

- **The correct adjustment setting is 35-40 mm.**

Chain Free-movement Inspection



1. Maximum movement position

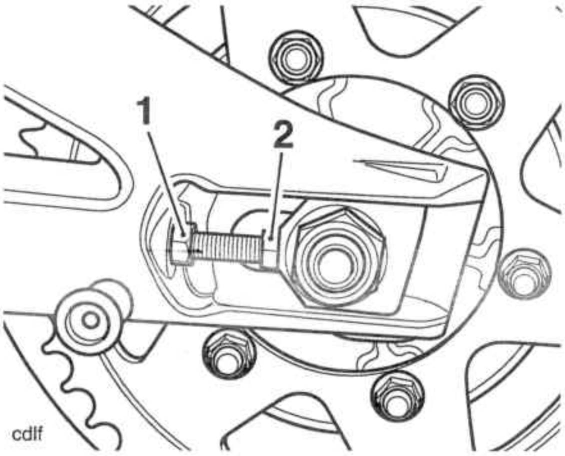
Warning

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. Place the motorcycle on a level surface and hold it in an upright position with no weight on it.
2. Rotate the rear wheel by pushing the motorcycle to find the position where the chain has least slack. Measure the chains vertical movement, mid-way between sprockets.
3. If correct, the vertical movement of the drive chain midway between the sprockets should be 35-40 mm.

Chain Free-movement adjustment

1. Loosen the wheel spindle nut.
2. Release the locknuts on both the left hand and right hand chain adjuster bolts.



1. Adjuster bolt locknut
2. Adjuster bolt
3. Rear wheel spindle nut

3. Moving both adjusters by an equal amount, turn the adjuster bolts clockwise to increase chain free movement and counter clockwise to reduce chain free movement.
4. When the correct amount of chain free movement has been set, push the wheel into firm contact with the adjusters.

Note:

- **Check for equal adjustment on both sides using the graduation marks on the swinging arm.**

5. Tighten both adjuster locknuts to **27 Nm** and the rear wheel spindle nut to **110 Nm**.
6. Repeat the chain adjustment check. Re-adjust if necessary.

Warning

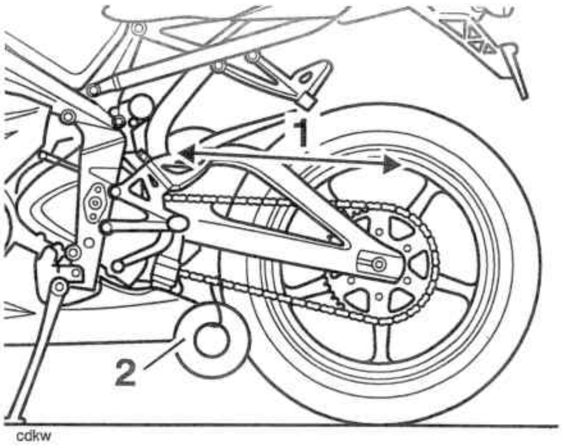
Operation of the motorcycle with insecure adjuster locknuts or a loose wheel spindle may result in impaired stability and handling of the motorcycle. This impaired stability and handling may lead to loss of motorcycle control and an accident.

7. Check the rear brake effectiveness. Rectify if necessary.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

Chain Wear Inspection



1. Measurement across 20 links
2. 10-20kg Weight

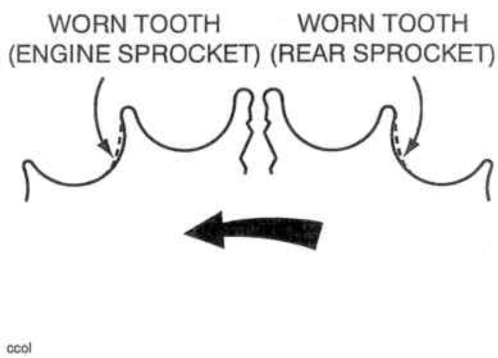
Warning

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 chain guard from the swinging arm.
2. Stretch the chain taut by hanging a 10-20 kg (20-40 lb) weight on the chain.
3. Measure a length of 20 links on the straight part of the chain from pin centre of the 1st pin to pin centre of the 21st pin. Repeat the test at various sections of the chain to establish an average reading. This is because the chain may wear unevenly.
4. If the length exceeds the service limit of 319 mm (12.56 in), the chain must be replaced.

> **Warning**
>
> A chain that breaks or jumps off the sprockets could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing loss of control and an accident.

5. Examine the whole length of the chain. If there are any excessively tight or loose sections, loose pins or damaged rollers, the chain should be replaced.
6. Inspect sprockets for unevenly or excessively worn teeth. Also examine the sprockets for damaged teeth.



Note:

- **Sprocket wear is exaggerated for illustration purposes.**

> **Warning**
>
> The use of non-approved chains may result in a broken chain or may cause the chain to jump off the sprockets.
>
> Use a genuine Triumph supplied chain as specified in the Triumph Parts Catalogue.
>
> Never neglect chain maintenance and always have chains installed by an authorised Triumph dealer.

7. If there is any irregularity found in any of the components, replace the drive chain and/or any other damaged components.
8. Refit the chain guard, tightening the fixings to **4.5 Nm**.

Rear Suspension Unit

Removal

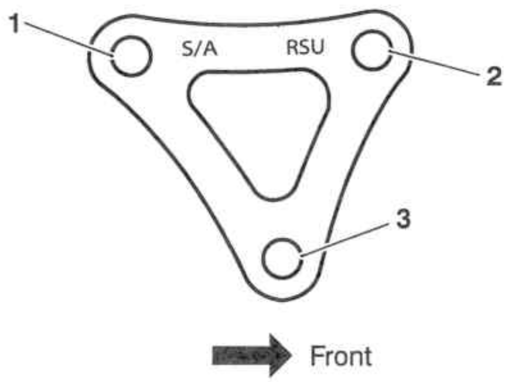
> **Warning**
>
> If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

> **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. Raise and support the rear of the motorcycle under the frame or engine. Position a block to support the rear wheel.
2. Remove the seats (see page *16-11*).
3. Disconnect the battery, negative (black) lead first.
4. Remove the rear panel (see page *16-12*).
5. Remove the lower fairings (see page *16-13*).
6. Remove the exhaust system (see page *10-129*).
7. Remove the three drop link plate fixings. Discard the nuts.

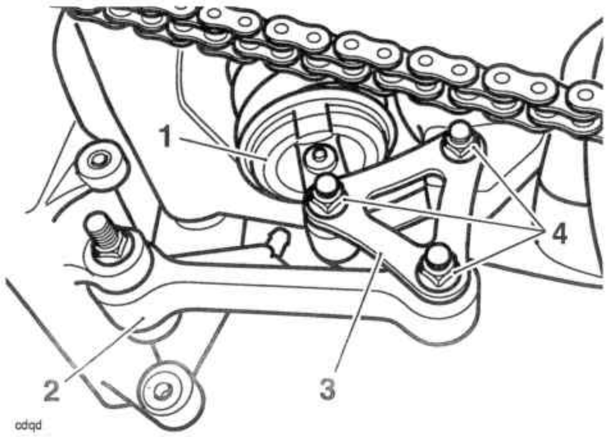
Note:

- **Both drop link plates are marked as shown below. Both plates are identical, and must be fitted with the bolt hole markings facing the right hand side of the motorcycle.**



1. Swinging arm bolt position
2. Rear suspension bolt position
3. Drag link bolt position

8. Noting the orientation of the drop link plates, remove the plates and position the drag link clear.



1. Rear suspension unit
2. Drag link
3. Drop link
4. Fixings

⚠ Warning

Never attempt to disassemble the rear suspension unit or reservoir. It contains fluid under pressure and serious injury could result if any part of the system is disturbed.

9. Remove the rear suspension unit upper mounting nut and bolt, and manoeuvre the unit upwards through the swinging arm and clear of the motorcycle.

Inspection

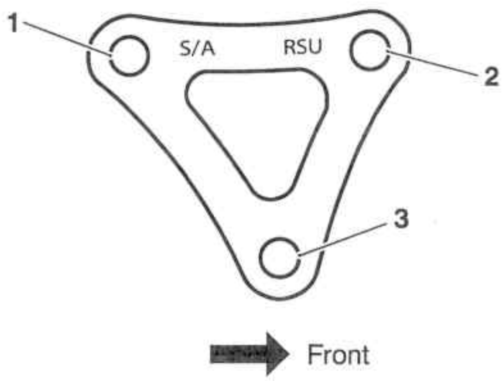
1. Clean all components and inspect for damage/wear to:
    - rear suspension unit upper and lower mountings,
    - lower mounting spacer, bearing and seals,
    - drop link bearings, sleeves and seals.
2. Renew as necessary.
3. Check the swinging arm drop link bearing for wear. Overhaul as necessary.
4. Check the drag link bearings for wear. Overhaul as necessary (see page *12-11*).
5. Inspect the unit for damage and fluid leaks. If there is any damage, or fluid leaks are evident, the unit must be replaced.

Installation

1. Remove the drag link sleeve and pack the bearing with fresh grease. Refit the sleeve.
2. Remove the rear suspension lower sleeve and pack the bearing with fresh grease. Refit the sleeve.
3. Remove the swinging arm drop link sleeve and pack the bearing with fresh grease. Refit the sleeve.
4. Refit the rear suspension unit to the motorcycle by lowering the unit downwards through the hole in the swinging arm.
5. Locate the rear suspension unit and loosely fit the upper mounting bolt and a new nut.

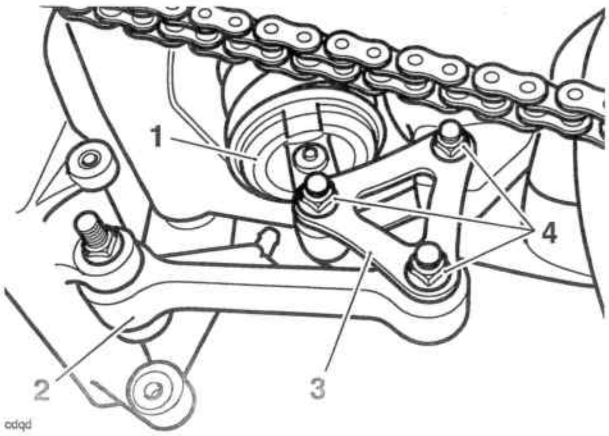
Note:

- **The drop link plates are marked as shown below. Both plates are identical, and must be fitted with the bolt hole markings facing the right hand side of the motorcycle.**



1. Swinging arm bolt position
2. Rear suspension bolt position
3. Drag link bolt position

6. Locate the drop link plates and, from the right hand side, loosely fit the bolts and new nuts.



1. Rear suspension unit
2. Drop link plate
3. Drag link
4. Fixings

7. Tighten the three drop link fixings to **48 Nm**.
8. With the weight of the motorcycle on its wheels, tighten the rear suspension unit upper mounting to **48 Nm**.
9. Refit the exhaust system (see page *10-132*).
10. Refit the lower fairings (see page *16-14*).
11. Fit the rear panel (see page *16-12*).
12. Connect the battery, red (positive) lead first.
13. Fit the seats (see page *16-11*).

Drag Link

Removal

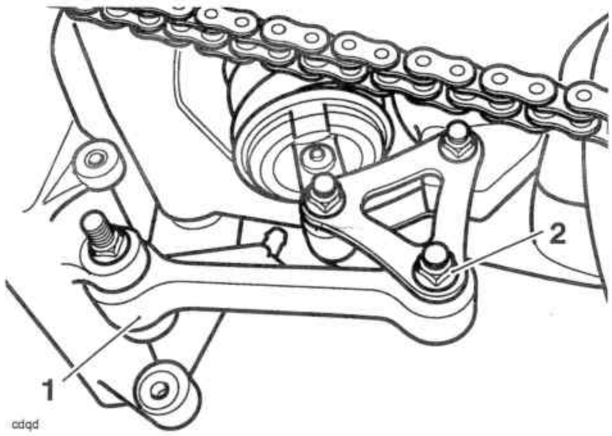
Warning

If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

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. Raise and support the rear of the motorcycle beneath the frame or engine. Position a block to support the rear wheel.
2. Remove the seats (see page *16-11*).
3. Disconnect the battery, negative (black) lead first.
4. Remove the rear panel (see page *16-12*).
5. Remove the exhaust system (see page *10-129*).
6. Remove the two fixings securing the drag link.
7. Remove the link.



1. Drag link
2. Fixings

Inspection

1. Clean all components and inspect the drag link and bearings for damage/wear.
2. Check the rear suspension unit lower bearings for wear.
3. Check the drop link upper bearings for wear.
4. Renew as necessary.

Installation

1. Remove the drag link sleeves and pack the bearings with fresh grease. Refit the sleeves.
2. Refit the drag link, fit the bolts and new nuts, and tighten to **48 Nm**.
3. Refit the exhaust system (see page *10-132*).
4. Refit the lower fairings (see page *16-13*).
5. Fit the rear panel. (see page *16-12*).
6. Connect the battery, red (positive) lead first.
7. Fit the seats (see page *16-11*).

Swinging Arm

Removal

Warning

If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

Warning

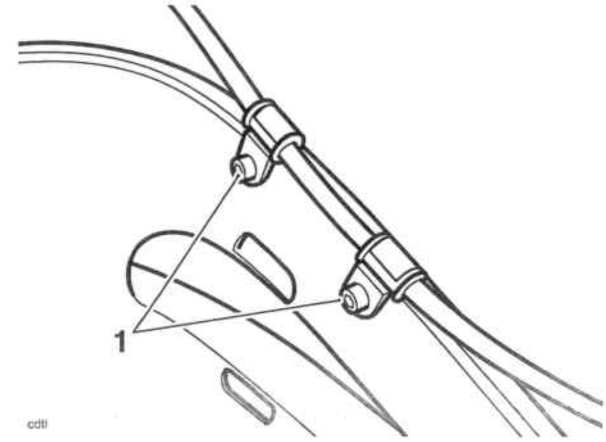
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the seats (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the rear panels (see page *16-12*).
4. Remove the lower fairings (see page *16-13*).
5. Remove the exhaust system (see page *10-129*).
6. Remove the rear wheel (see page *15-8*).
7. Support the swinging arm and remove the rear suspension unit (see page *12-8*).
8. Remove the sprocket cover.
9. Detach the chain from the output sprocket.

Warning

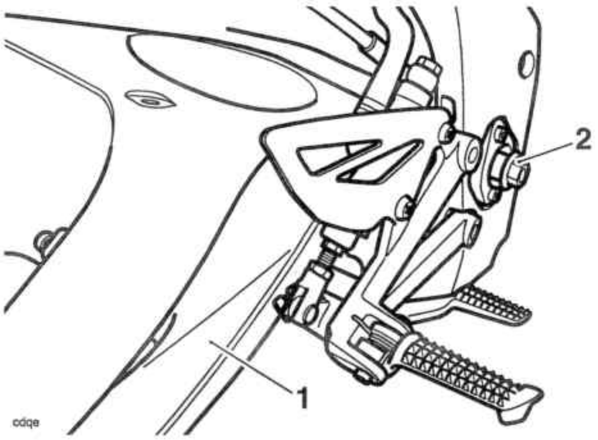
Do not allow the caliper to hang on the brake hose as this may damage the hose and could lead to an accident.

10. Release the brake hose clips from the swinging arm and tie the rear brake caliper to one side.



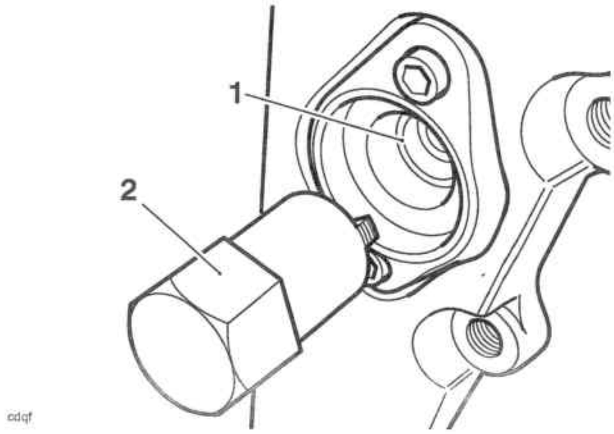
1. Rear brake hose clips

11. Remove and discard the swinging arm spindle nut.
12. Partially withdraw the swinging arm spindle from the right hand side, to allow access to the frame adjuster sleeve located on the left hand side of the frame.



1. Swinging arm
2. Spindle

13. Engage tool T3880295 in the slots of the frame adjuster sleeve and rotate anti-clockwise to slacken the sleeve fully.

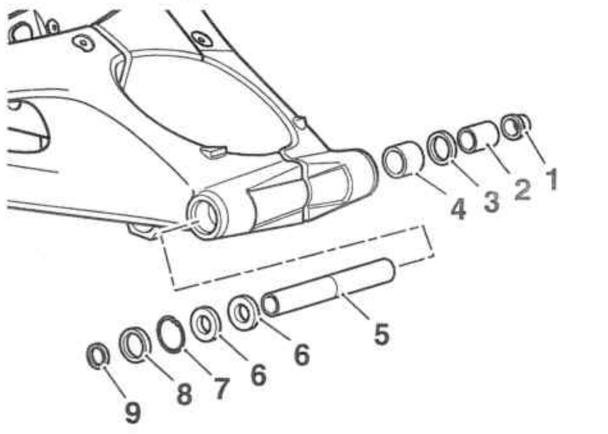


1. Frame adjuster sleeve
2. Tool T3880104

14. Withdraw the swinging arm spindle from the right hand side and remove the swinging arm, together with the drive chain.

- **Support the drive chain while the swinging arm is being removed to protect it from contamination.**
- **If the swinging arm is to be replaced remove the drive chain (see page *12-14*).**

15. Remove the bearing sleeves from both sides.
16. Remove the right hand bearing by drifting through from the left.
17. Collect the spacer tube.



1. Frame adjuster sleeve
2. Sleeve
3. Seal
4. Needle roller bearing
5. Spacer tube
6. Ball Bearing
7. Circlip
8. Seal
9. Spacer

Note:

- **The needle roller bearing in the left hand side of the arm cannot be removed undamaged.**

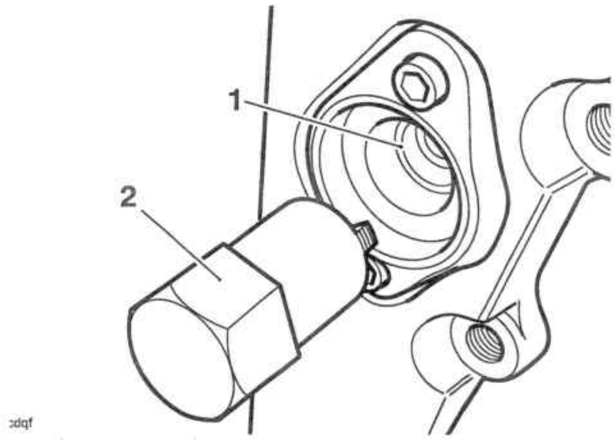
18. Remove the drive chain rubbing strip.

Inspection

1. Check all swinging arm bearings for damage, pitting, and cracks. Replace as necessary.
2. Check the swinging arm for damage. Replace as necessary.
3. Check the wheel bearings for damage, pitting, and cracks. Replace as necessary.
4. Check all bearing seals for damage, splits etc. Replace as necessary.
5. Check the chain for wear, damage etc. Replace as necessary.
6. Check both sprockets for wear, damage etc. Replace as necessary.
7. Check the drive chain rubbing strip for wear and damage. Replace as necessary.

Assembly

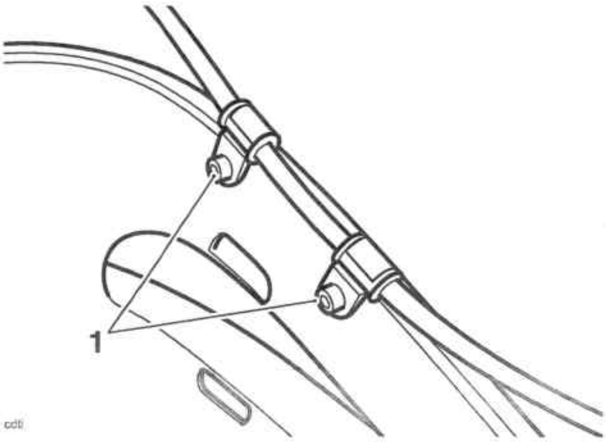
1. Install the bearings (marked faces outwards), sleeves etc. into the swinging arm in the order shown on the previous page. Use new seals throughout.
2. Fit the drive chain rubbing strip and tighten the fixing to **9 Nm**.
3. Fit the drive chain to the swinging arm (see page *12-14*).
4. Position the swinging arm to the frame ensuring the drive chain is in position on the rubbing strip.
5. Refit the swinging arm spindle from the right hand side such that it will support the swinging arm, but not pass all the way through the frame adjuster sleeve. This will allow tool T3880104 to engage in the slot in the frame adjuster sleeve.
6. Using tool T3880104, tighten the frame adjuster sleeve to **6 Nm**.



1. Frame adjuster
2. Tool T3880104

7. Fully insert the swinging arm spindle.
8. Fit a new swinging arm spindle nut and tighten to **110 Nm**.
9. Fit the drive chain to the output sprocket.
10. Refit the sprocket cover and tighten the bolts to **9 Nm**.

11. Release the caliper and refit the rear brake hose clips to the swinging arm. Tighten the fixings to **6 Nm**.



1. Rear brake hose clips

12. Refit the rear suspension unit (see page *12-9*).
13. Refit the rear wheel (see page *15-8*).
14. Refit the exhaust system (see page *10-132*).
15. Refit the lower fairings (see page *16-14*).
16. Refit the rear panel (see page *16-12*).
17. Connect the battery, red (positive) lead first.
18. Fit the seats (see page *16-11*).
19. Pump the rear brake pedal several times to position the brake pads in the caliper. Rectify as necessary if correct brake operation is not restored (see page *14-23*).

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Drive Chain Replacement

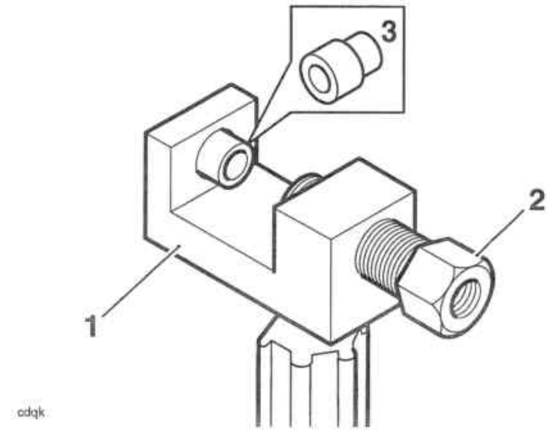
Rivet link type

As the drive chain passes through the swinging arm casting, the chain must be split for removal from the motorcycle. Removal of the swinging arm is not required for drive chain replacement. The following instructions for the replacement of rivet link type drive chains requires the use of service tool T3880027.

Warning

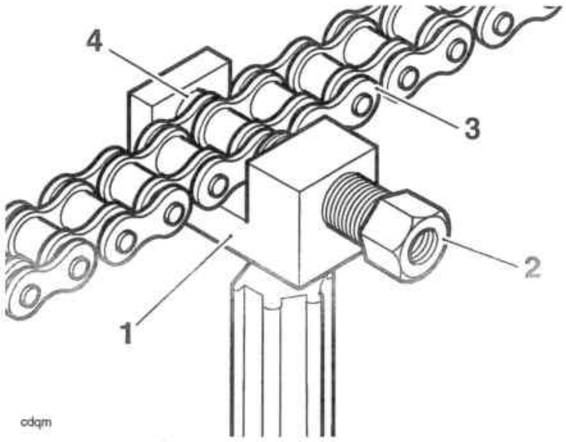
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Support the motorcycle on a stand so the rear wheel is clear of the ground.
2. Insert the hollow chain cutting tail piece into the tool body so its larger diameter end is facing towards the large pressure screw as shown.



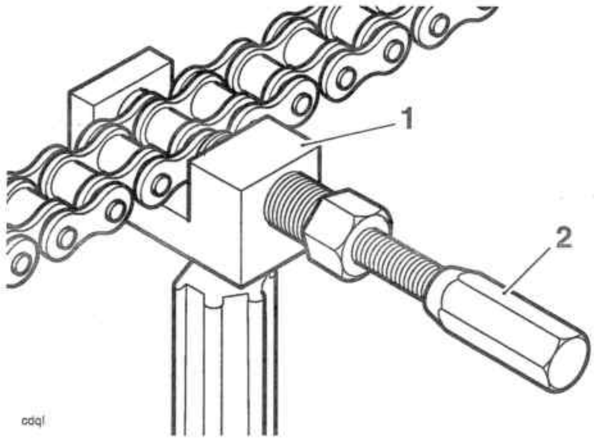
1. Tool T3880027
2. Large pressure screw
3. Chain cutting tail piece

3. Position the chain to the tool ensuring that the chain link pin which is to be removed is aligned with the holes in the chain cutting tail piece and the large pressure screw. Tighten the large pressure screw by hand to grip the chain.



1. Tool T3880027
2. Large pressure screw
3. Chain
4. Chain cutting tail piece

4. Insert the small pressure screw into the larger pressure screw as shown below, until the cutting pin on the small pressure screw contacts the link pin. Ensure that the cutting pin is centralised on the link pin to be removed.



1. Tool T3880027
2. Small pressure screw

5. Retain the tool body then tighten the small pressure screw until the link pin is pressed out from the chain.
6. Repeat steps 3 to 5 on the remaining chain link pin.
7. Remove the tool and separate the two ends of the chain.
8. Remove the chain cutting tail piece from the body.

Note:

- **The replacement chain is supplied in a split condition, complete with a link kit to join the two ends.**

Caution

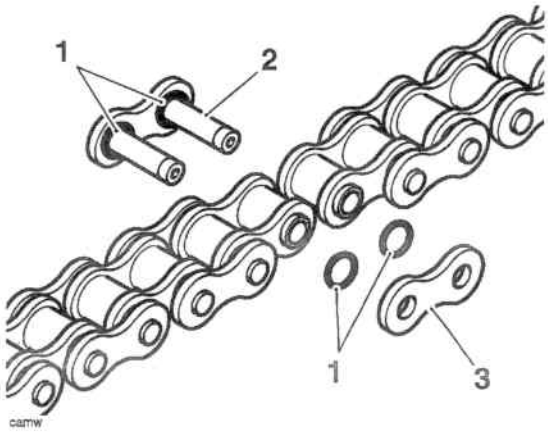
The component parts of the new link kit are coated with a special grease which must not be removed. Removal of this special grease will severely reduce the service life of the chain.

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.



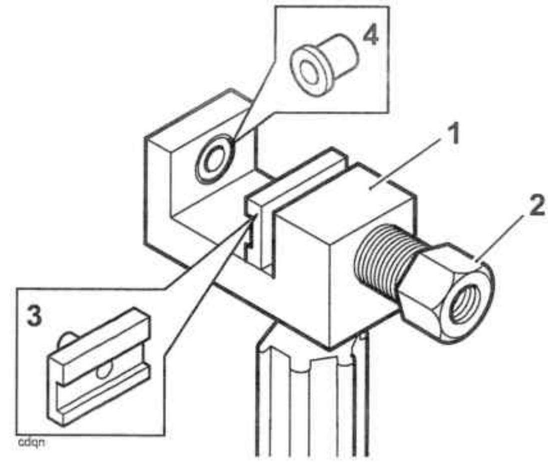
1. O-rings
2. Link
3. Link plate

11. Insert the riveting tail piece into the tool body so its larger diameter end is facing towards the large pressure screw as shown.

Note:

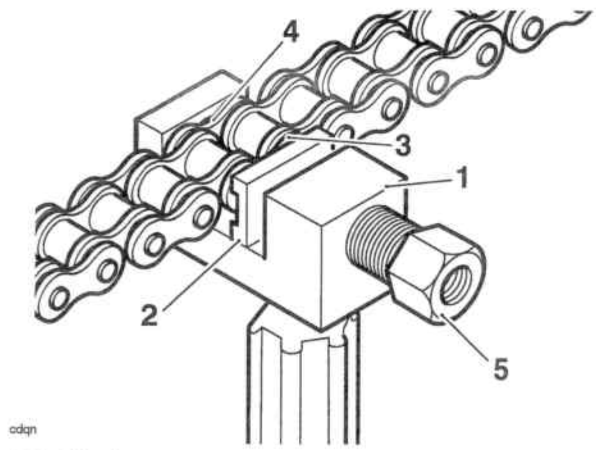
Tool T3880027 includes two link plate holders, one is for riveted link plates (marked PH5060R), the other is for link plates retained by a spring clip (marked PH4060C). The holder for riveted link plates has a shallow groove to allow for chain link clearance, the holder for clipped link plates has a deep groove to allow for chain link clearance.

12. Insert the link plate holder (marked PH5060R) into the large pressure screw.



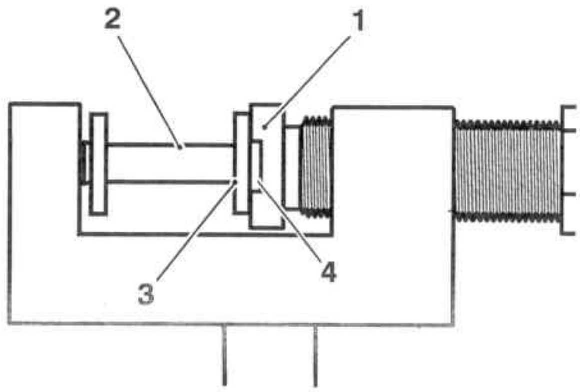
1. Tool body
2. Large pressure screw
3. Link plate holder (marked PH5060R)
4. Riveting tail piece

13. Position the tool to the chain. Ensure the link plate holder is correctly located in the large pressure screw.



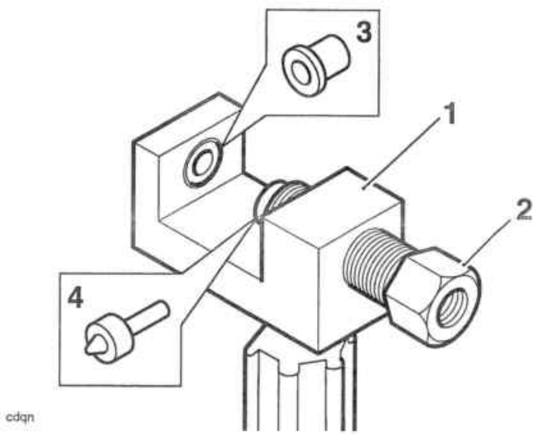
1. Tool body
2. Link plate holder (marked PH5060R)
3. Link plate
4. Link
5. Large pressure screw

14. Locate the split link pins such that the pins will enter the groove in the link plate holder when the link plate is pressed on to the link.



1. Link plate holder
2. Link plate
3. Chain link
4. Link plate holder groove

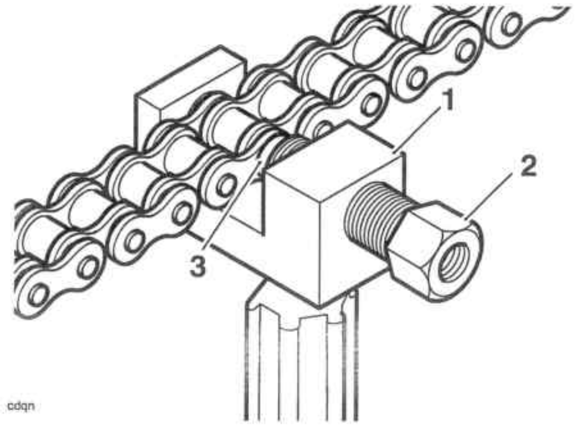
15. Retain the tool body and tighten the large pressure screw until the link plate is pressed fully onto the link.
16. Back off the pressure screw, slide the tool assembly to one side and check that the split link is correctly assembled.
17. Remove the link plate holder from the tool. Do not remove the riveting tail piece from the tool
18. Insert the flare pin into the large pressure screw.



1. Tool body
2. Large pressure screw
3. Riveting tail piece
4. Flare pin

19. Locate one of the split link pins into the riveting tail piece and screw the large pressure screw in until the flare pin contacts the split link end. Ensure the split link pin is centrally located on the flare pin.

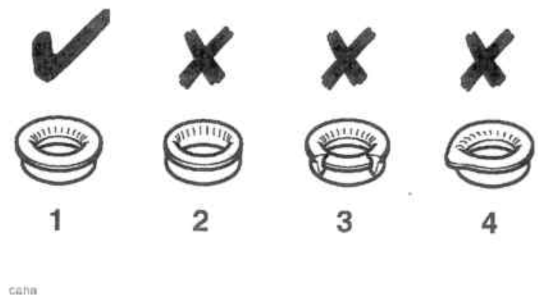
20. Retain the tool body and tighten the large pressure screw until the split link end is riveted-over.



1. Tool body
2. Large pressure screw
3. Flare pin

21. Back off the large pressure screw and rivet the remaining split link pin as described above.

22. Remove the tool from the chain and check that both the split link pins are correctly riveted as shown below.



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.

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13 Front Suspension

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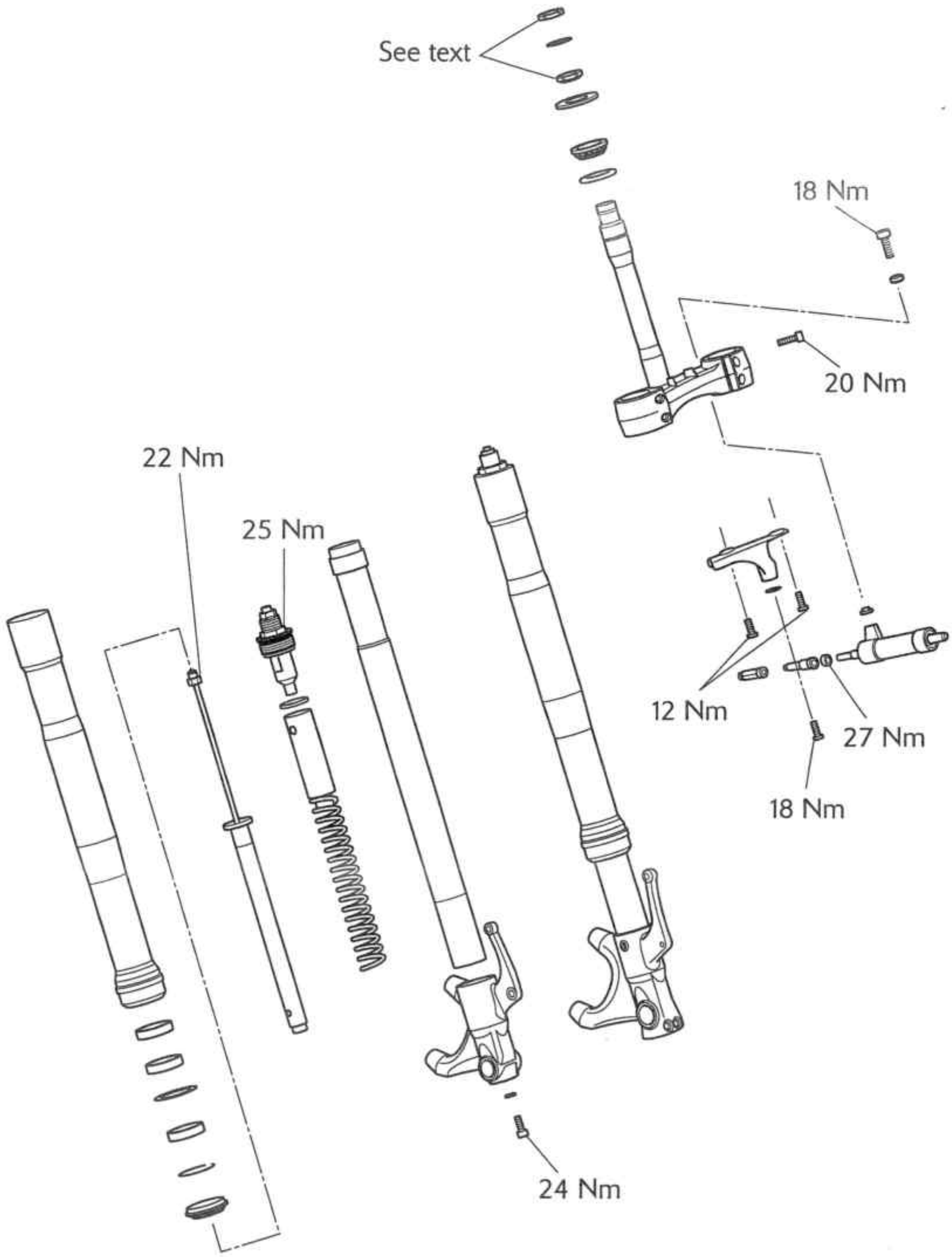
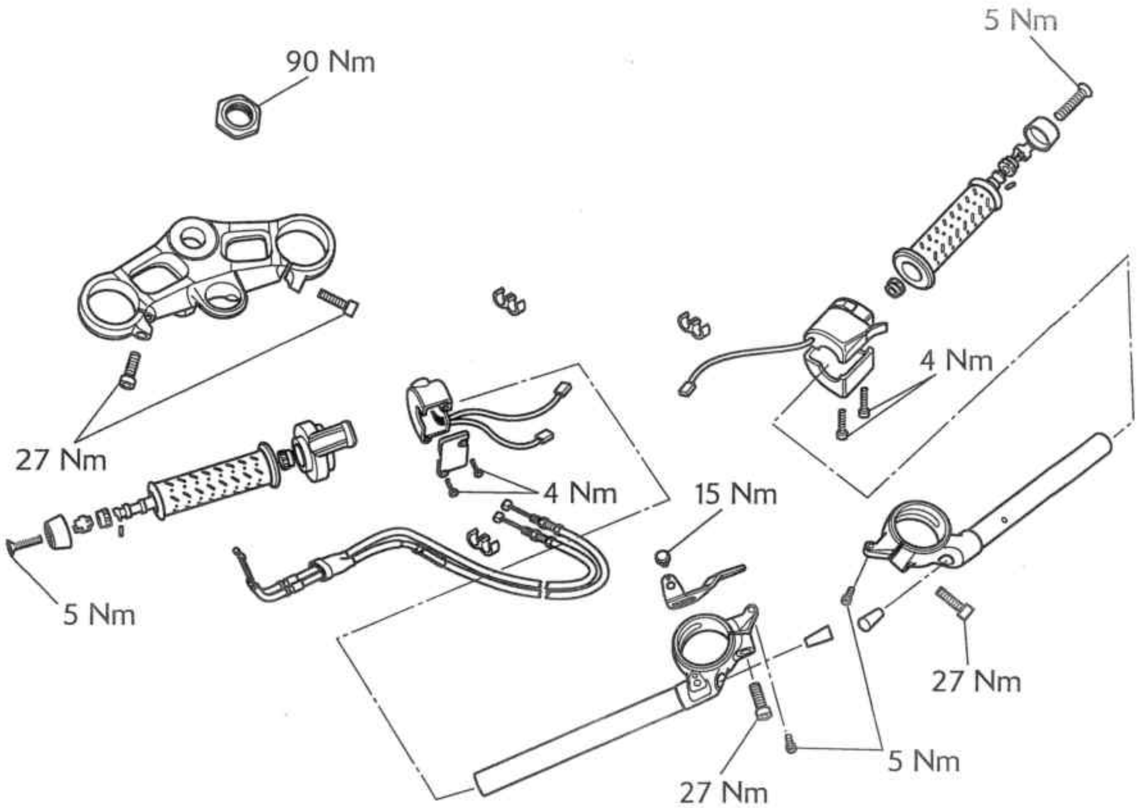
Front Suspension

Exploded View - Front Fork



Exploded View - Handlebars



Front Suspension

The Daytona 675 is equipped with hydraulic, adjustable, telescopic front forks. Both forks are adjustable for spring pre-load, compression damping and rebound damping.

Periodic inspection for damage and fluid leaks is essential for safe riding. Always follow the inspection instructions at the intervals stated in the scheduled maintenance chart.

A hydraulic, non-adjustable, steering damper is fitted beneath the lower yoke. The damper rod is attached to the frame via a bracket above the radiator.

Fork Inspection

Examine each fork for any sign of damage or scratching of the slider surface or for oil leaks.

If any damage or oil leakage is found, strip and repair as described in this section or consult an authorised Triumph dealer.

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.**

If roughness or excessive stiffness is detected, repair as described in this section or consult an authorised Triumph dealer.

Warning

Riding the motorcycle with defective or damaged suspension can cause loss of motorcycle control and an accident. Never ride with damaged or defective suspension.

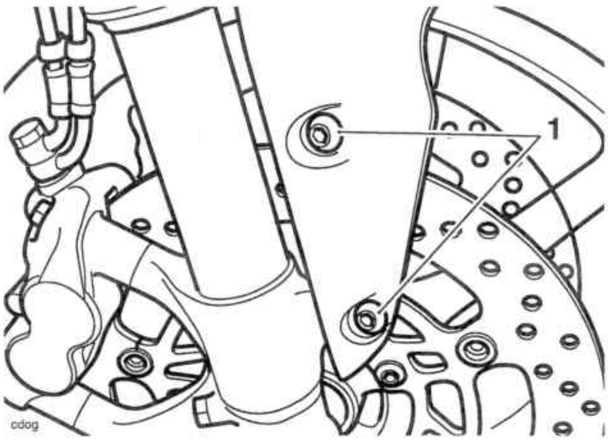
Front Fork

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. Raise and support the front of the motorcycle.
2. Remove the front wheel (see page *15-6*).
3. Release the four fixings and remove the front mudguard.



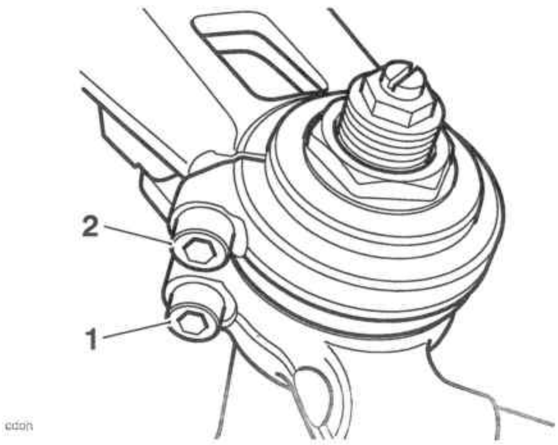
1. Mudguard fixings (right hand shown)

4. Detach and the support the front brake calipers (see page *14-12*).

Warning

Never allow the brake calipers to hang on the brake hoses as this may damage the hoses. A damaged brake hose can cause a reduction in braking efficiency leading to loss of motorcycle control and an accident.

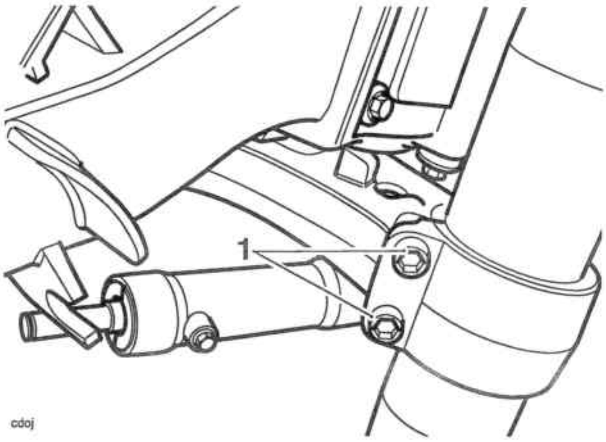
5. Slacken the handlebar and top yoke clamp bolts.



1. Handlebar clamp bolt
2. Top yoke clamp bolt

> **Caution**
>
> Care must be taken when removing the forks, to ensure that the outer surfaces do not become scratched.

6. Slacken the bottom yoke clamp bolts.

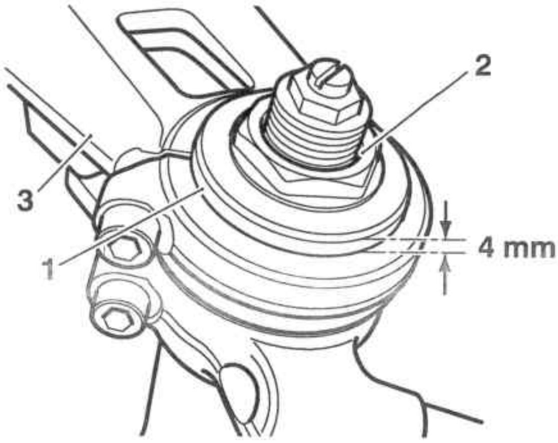


1. Bottom yoke clamp bolts

7. Using a downward, twisting action, withdraw the forks from between the yokes.

Installation

1. Position the fork within the yokes so that the lip of the outer tube, not the top cap, is 4 mm above the upper surface of the top yoke.



1. Outer tube
2. Top cap
3. Top yoke

2. Tighten the bottom yoke clamp bolts to **25 Nm**.
3. Tighten the top yoke clamp bolts to **20 Nm**.
4. Tighten the handlebar clamp bolts to **27 Nm**.
5. Refit the front mudguard. Tighten the fixings to **3 Nm**.
6. Install the front wheel (see page *15-7*).
7. Refit the front brake calipers (see page *14-14*).
8. Lower the motorcycle to the ground and park it on the side stand.

Fork Oil Change

Draining

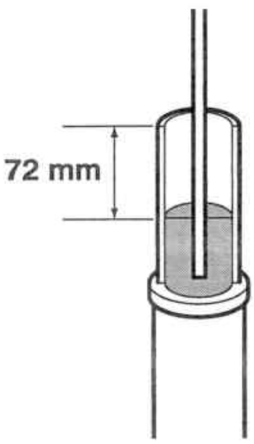
Warning

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 fork (see page *13-4*).
2. Remove the top cap assembly (see page *13-7*).
3. Remove the fork spring (see page *13-7*).
4. Holding the inner and outer tubes together, invert the fork and pour out the fork oil into a suitable container. Pump the damper rod to remove all the oil.

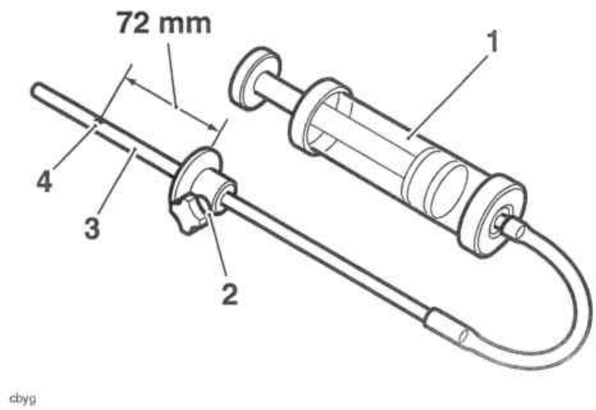
Oil Refilling

The oil level is measured from the upper surface of the fork outer tube, with the fork fully compressed and the spring removed.



Fork Oil Level (fully compressed)

1. Fill the fork with the grade of oil specified in the fork oil table, to a level above that which will finally be required.
2. Pump the fork assembly and damper 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 to stabilise.
3. Set the scale on tool 3880160-T0301 to 72 mm, as shown below.



1. Tool 3880160-T0301
2. Adjustment 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.

Warning

Incorrect fork oil levels could result in an unsafe riding condition leading to loss of control and an accident.

7. Assemble the fork (see page *13-10*).
8. Refit the fork (see page *13-5*).

Fork Oil Level Chart

Oil Level*	Oil Volume	Oil Grade	Fork Pull Through
72 mm	495 cc	Kayaba KHL15-10	Top of the inner tube 4 mm above the upper face of the top yoke

***Fork Fully Compressed**

Front Fork

Disassembly

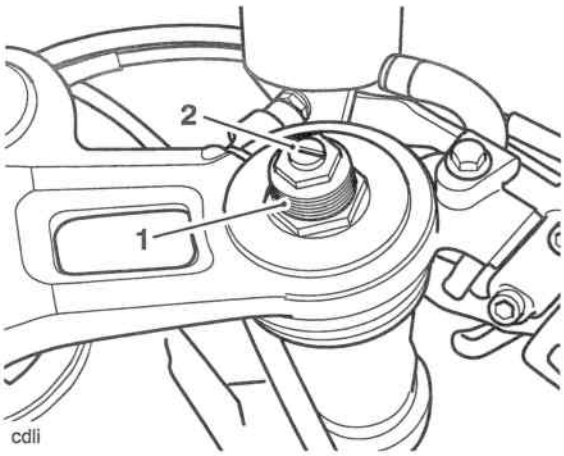
Warning

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:

- **Before removing the forks, slacken the top cap a little to allow easier removal during strip-down.**

1. Remove the forks (see page *13-4*).
2. Note the position of the preload adjuster relative to the fork cap to ensure the setting is retained on re-assembly.



1. Preload adjuster marks
2. Compression/rebound adjuster

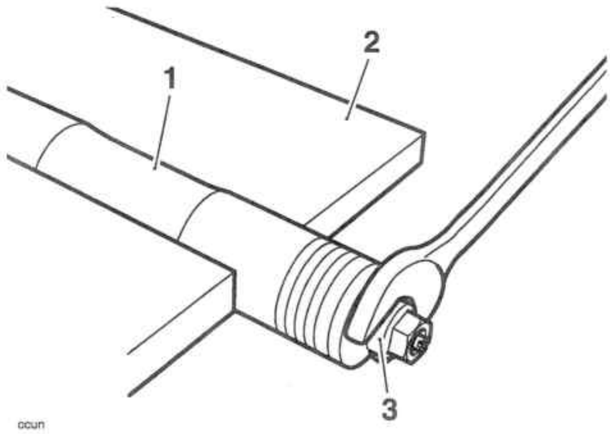
Warning

Do not change the fork adjustment settings. If they are changed, this will change the handling of the motorcycle from those which the rider is used to. Riding with unfamiliar fork settings may cause unexpected handling characteristics leading to loss of motorcycle control and an accident.

Note:

- **The fork seals can be renewed without removal of the damping cylinder. Unless removal of the damping cylinder is necessary, omit items 16 and 17 of this procedure.**

3. Very gently clamp the fork in the soft jawed vice to prevent it from turning, hold the outer tube, then unscrew the top cap from the outer tube.



1. Fork
2. Soft jaws
3. Top cap

Caution

Never tightly clamp the outer tube as this will cause the tube to permanently distort. A distorted tube is not serviceable and must be replaced.

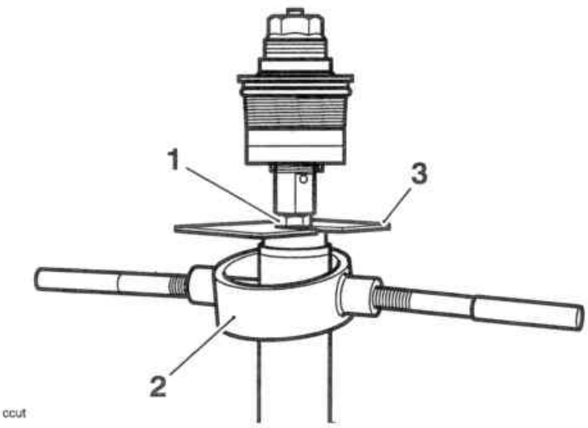
Note:

- **The top cap is not under spring tension and will not spring upwards when the threads disengage.**

4. Holding the inner and outer tubes together, invert the fork and pour out the fork oil into a suitable container. Pump the damper rod to remove all the oil.
5. Return the fork to the soft jawed vice.
6. Allow the outer tube to fall into the inner.

> **Warning**
>
> While compressing the fork spring and while the spring holder is in place always wear protective equipment for the face and eyes and never stand directly above or look directly down on the fork. If the spring compressor or holder should dislodge or detach, the resulting release of spring tension could cause parts to fly off resulting in injury to the user.

7. Fit tool T3880067 over the top cap. Position the two adjustable arms to the holes in the spring spacer. Screw in the arms until they positively engage in the spring spacer holes.
8. Using tool T3880067, manually compress the fork spring and insert the spring holder as shown, below the damper locknut.

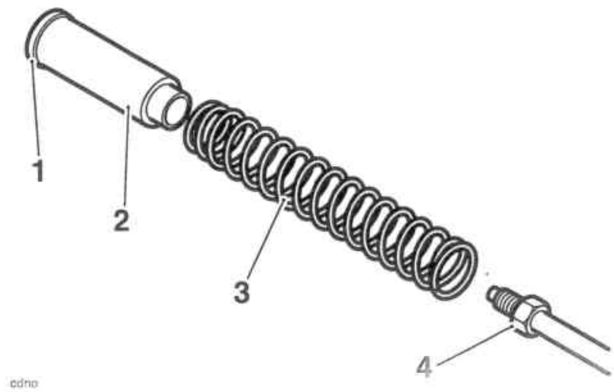


1. Damper locknut
2. Tool T3880067
3. Spring holder (part of T3880067)

9. Slacken the locknut, unscrew and remove the top cap and damper rod. If necessary, remove the O-ring seal from the top cap assembly. The top cap assembly cannot be dismantled.
10. Recompress the fork spring to remove the holder.

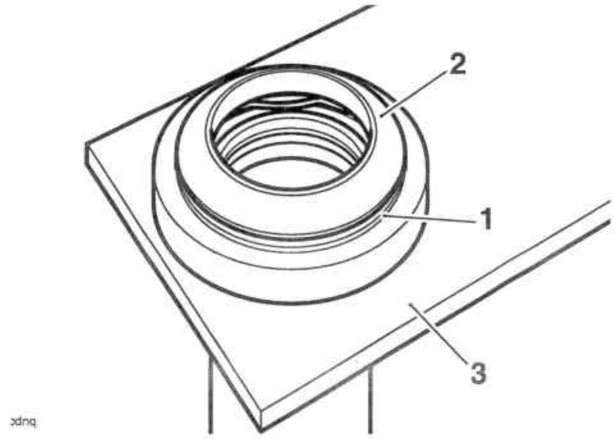
> **Warning**
>
> While compressing the fork spring and while the spring holder is in place always wear protective equipment for the face and eyes and never stand directly above or look directly down on the fork. If the spring compressor or holder should dislodge or detach, the resulting release of spring tension could cause parts to fly off resulting in injury to the user.

11. Remove the washer, spring spacer and spring.



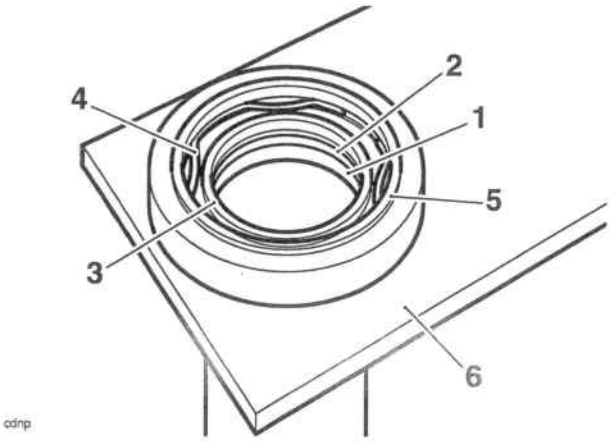
1. Washer
2. Spring spacer
3. Spring
4. Damper rod

12. Separate the inner and outer tubes leaving the seals and bushes in place on the outer tube.
13. Invert and mount the fork outer tube to tool T3880002.
14. Remove the dust cover from the outer tube.



1. Fork outer tube
2. Dust cover
3. Tool T3880002

15. Carefully remove the circlip, oil seal and bushes from the outer tube. Note the relative positions of all parts before removal.

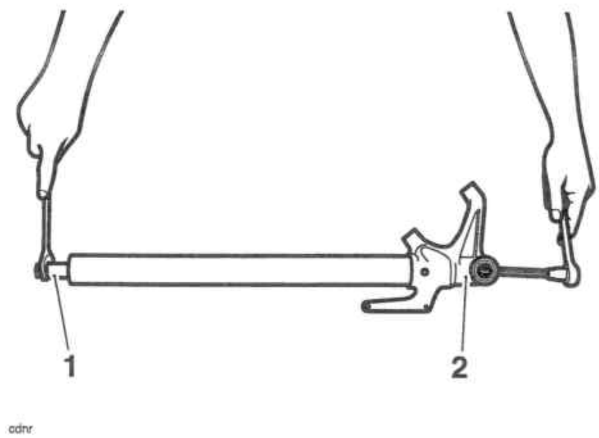


1. Bush
2. Washer
3. Oil seal
4. Circlip
5. Outer tube
6. Tool T3880002

16. Insert the slotted end of tool T3880028 over the damper rod and locknut, engage the slots in the tool to corresponding slots in the damping cylinder inside the fork. Hold the flats of the tool to prevent the cylinder from turning while removing the damper bolt from the bottom of the fork. Discard the washer from the damper bolt.

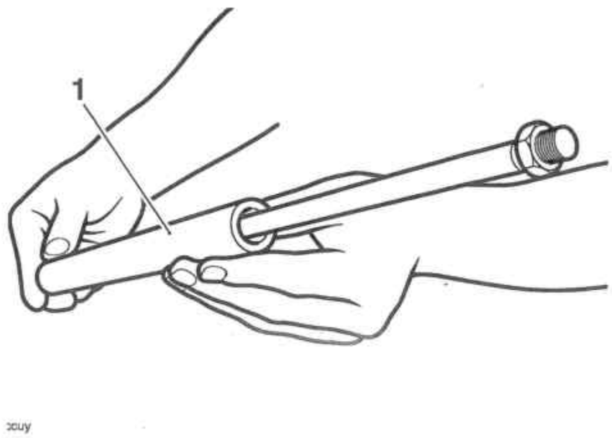
Note:

- **Tool T3880028 is designed to fit over the top of the damper rod locknut.**



1. Tool T3880028
2. Damping cylinder bolt location

17. Remove the tool, then the damping cylinder from the inner tube.



1. Damping cylinder

Inspection

1. Inspect the inner tube for stone chips, scoring, scratches, excessive wear and any other damage. Renew as necessary.

Note:

- **Small inclusions in the inner tube may be removed using a fine grade stone or similar.**

2. Inspect the spring for damage, cracks and deformation. Renew the spring if necessary.
3. Inspect all the bushes and seals for damage. Renew any damaged items if necessary.

Assembly

⚠ Warning

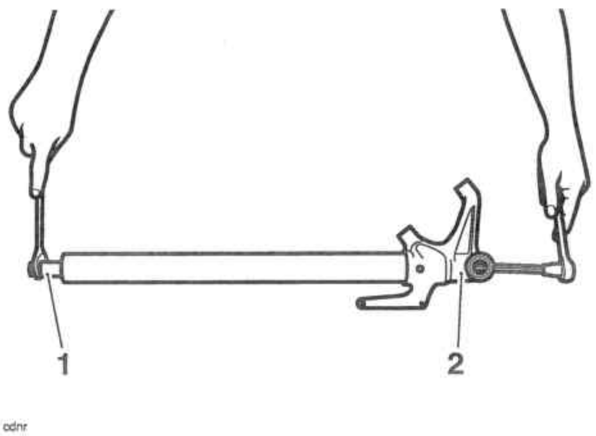
The front forks comprise many precision machined parts. Total cleanliness must be observed at all times and assembly must take place in a dirt/dust-free environment.

Dirt ingress may cause damage to the fork parts, leading to incorrect operation, instability, loss of control or an accident.

Note:

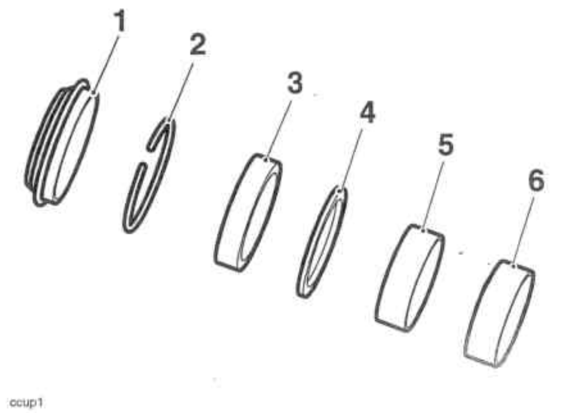
- **If the damping cylinder has not been removed, omit operations 1 and 2.**

1. Fit the damping cylinder to the inner tube and engage tool T3880028 as during removal.
2. Clean the threads of the damping cylinder bolt and fit a new sealing washer. Apply a drop of ThreeBond 1342 to the threads then install the bolt. Prevent the cylinder from turning by holding the flats at the end of tool T3880028 while tightening the damping cylinder securing bolt to **24 Nm**.



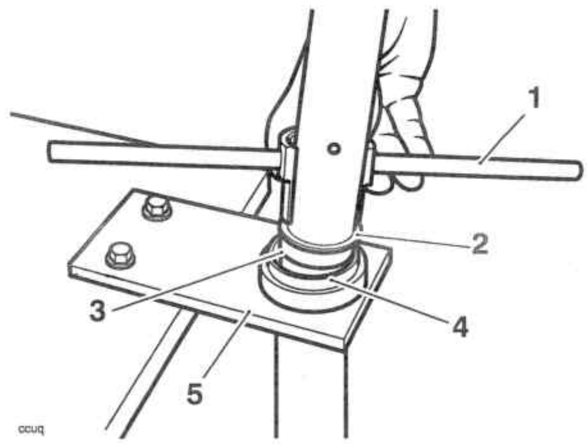
1. Tool T3880028
2. Damping cylinder bolt location

3. Invert and position the outer fork tube to tool T3880002.
4. Apply a smear of fork oil to the bushes and seals.
5. Position the seals and lower bush to the inner tube as noted prior to removal. Use a new circlip.



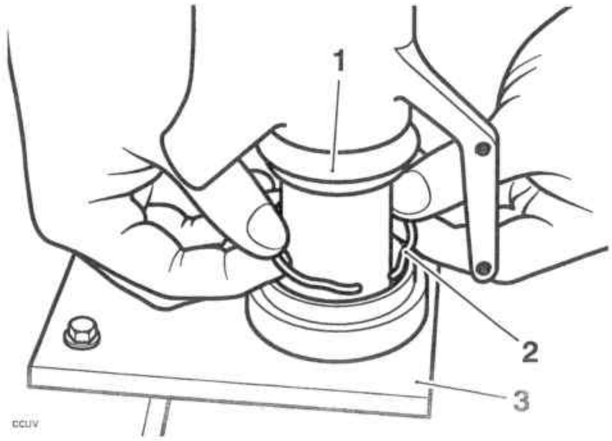
1. Dust seal
2. Circlip
3. Oil seal
4. Washer
5. Lower bush
6. Upper bush

6. Using a suitable tool, fit the upper bush to the outer fork outer tube.
7. Position the inner tube assembly to the outer, ensuring that the oil and dust seal lips do not become damaged.
8. Using the narrow end of tool T3880003, push/tap the bush, washer and seal into position.



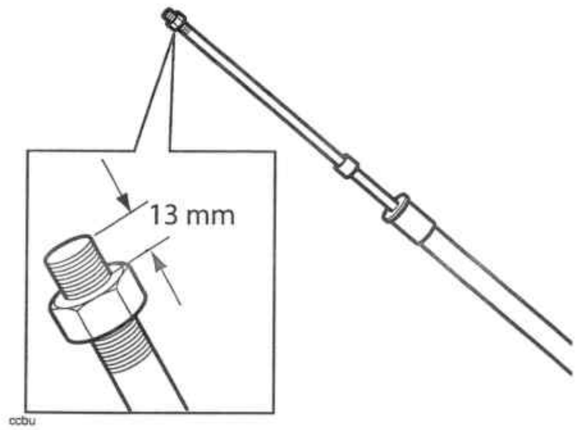
1. Tool T3880003
2. Seal
3. Washer
4. Bush
5. Tool T3880002

9. Retain the bush, washer and seal with the new circlip.

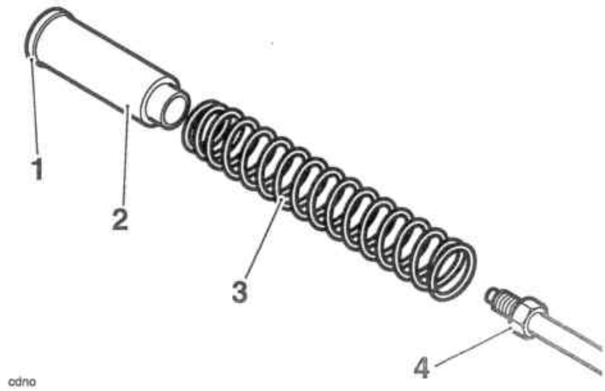


1. Dust seal
2. Circlip
3. Tool T3880002

10. Position the dust seal to the outer tube.
11. Invert tool T3880003 and, using hand pressure only, push the dust seal squarely into the outer tube.
12. Fill the fork with oil (see page *13-7*).
13. Position the fork assembly as for compression of the fork spring during strip down.
14. Rethread the damper rod locknut leaving **13 mm** of thread exposed above the nut.



15. Refit the fork spring, close wound end uppermost, spring spacer and washer.



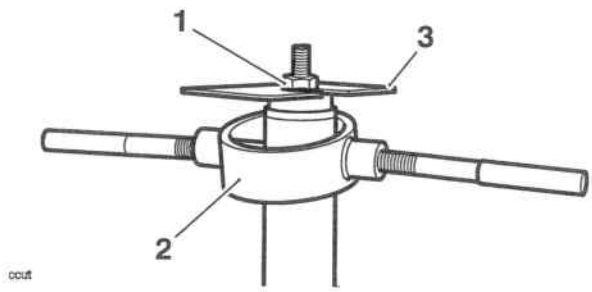
1. Washer
2. Spring spacer
3. Spring
4. Damper rod

16. Attach tool 3880085-T0301 to the threads of the damper rod and pull the damper upwards.

Warning

While re-compressing the fork spring and while the spring holder is in place always wear protective equipment for the face and eyes and never stand directly above or look directly down on the fork. If the spring compressor or holder should dislodge or detach, the resulting release of spring tension could cause parts to fly off resulting in injury to the user.

17. Refit tool T3880067 as previously described, compress the fork spring and refit the spring holder.



1. Damper locknut
2. Tool T3880067
3. Spring holder (part of T3880067)

18. Remove tool 3880085-T0301 from the damper rod.

Caution

If removed, the damping rod locknut must be fitted with the flat face facing to the top of the fork. The slightly tapered face must face the fork spring. Incorrect orientation may lead to a loosening of the locknut.

19. Fit a new O-ring to the top cap.
20. Refit the top cap and the damper rod, turning the damping rod down to the pre-load adjuster mark noted prior to dismantling.
21. Hold the top cap while tightening the damper rod locknut to **22 Nm**.

Warning

While compressing the fork spring and while the spring holder is in place always wear protective equipment for the face and eyes and never stand directly above or look directly down on the fork. If the spring compressor or holder should dislodge or detach, the resulting release of spring tension could cause parts to fly off resulting in injury to the user.

22. Recompress the spring to remove the spring holder.
23. Lubricate the O-ring on the top cap with a smear of fork oil then screw the top cap fully into the inner tube.
24. Tighten the top cap to **25 Nm**.

Note:

- **It is much easier to tighten the top cap when the fork has been refitted.**

25. Refit the fork (see page *13-5*).

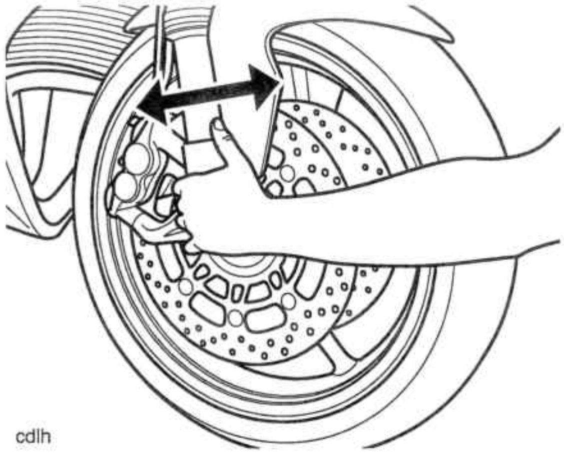
Headstock Bearing Check/ Adjustment

Check

1. Raise and support the front of 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.



Checking Headstock Bearing Adjustment

2. Hold the lower end of the front forks as illustrated and 'rock' with a front-to-rear motion. If free play can be detected, the headstock bearings require adjustment.

Adjustment

1. Raise and support the front of the motorcycle.
2. Slacken the handlebar and top yoke clamp bolts.

Warning

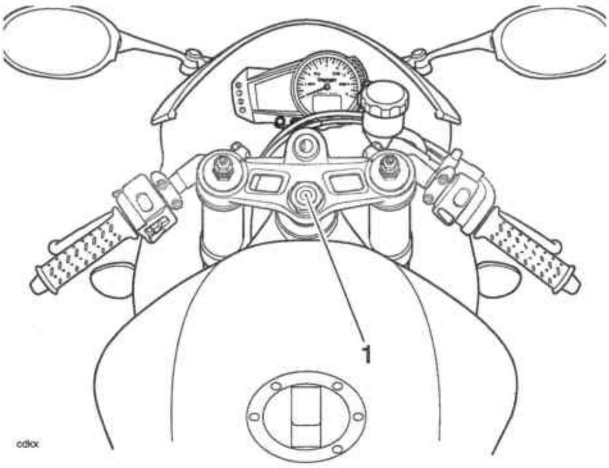
If the lower yoke fixings are also slackened, the forks will no longer support the weight of the motorcycle.

Do not slacken the lower yoke fixings as, in this condition, the motorcycle could topple over causing damage and/or risk of injury.

⚠ Caution

Care must be taken when removing the headstock top nut, to ensure that the top nut and headstock do not become scratched. Protect the surfaces with a suitable cloth or tape to prevent scratching.

3. Slacken the headstock top nut.



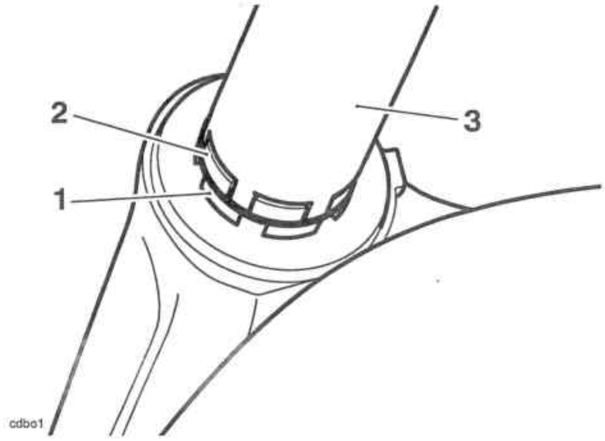
1. Headstock top nut

4. Ease the top yoke and handlebars from the forks and support while detached.
5. Adjust the bearing free-play as follows, all using tool T3880024:
   - **Remove the locknut and tab washer.**
   - **Slacken the adjuster nut then tighten to 40 Nm.**
   - **Slacken the adjuster nut, then retighten to 15 Nm.**
   - **Fit the tab washer and lock nut.**

⚠ 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 headstock bearings. This will introduce tight steering, which could cause loss of control and an accident.

   - Hold the adjuster nut in position while tightening the locknut to **40 Nm**.



1. Adjuster nut
2. Locknut
3. Tool T3880024

6. Refit the top yoke/handlebar assembly to the forks.
7. Tighten the top nut to **90 Nm**.
8. Tighten the top yoke clamp bolts to **20 Nm**.
9. Tighten the handlebar clamp bolts to **27 Nm**.
10. Recheck the bearing adjustment (see page *13-12*).

Headstock Bearing Removal

Warning

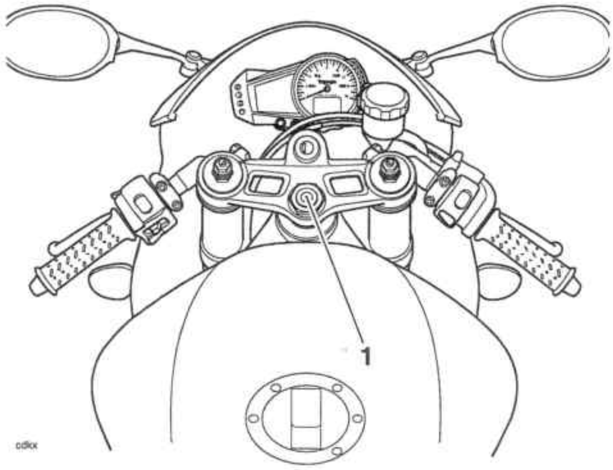
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help to prevent it falling and causing injury to the operator or damage to the motorcycle.

1. Remove the steering damper (see page *13-16*).
2. Remove both forks (see page *13-4*).

Caution

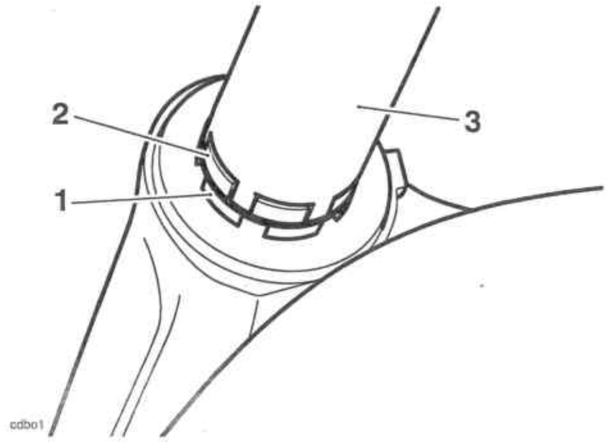
Care must be taken when removing the headstock top nut, to ensure that the top nut and headstock do not become scratched. Protect the surfaces with a suitable cloth or tape to prevent scratching.

3. Remove the headstock top nut.



1. Headstock top nut

4. As an assembly, raise the top yoke and handle bars until clear of the steering stem. Rest the assembly forward of the steering stem such that access to the adjustment nuts is unrestricted.
5. Using tool T3880024, remove the locknut and tab washer. Discard the tab washer.



1. Locknut
2. Adjuster nut

6. Using the same tool, remove the adjuster nut.
7. Remove the bottom yoke from below the frame headstock.

Warning

Always wear eye, hand and face protection when using a hammer and drift. Use of a hammer and drift can cause bearings to fragment. Pieces of fragmented bearing could cause eye and soft tissue injuries if suitable protective apparel is not worn.

8. Using a suitable drift, evenly and progressively drive the bearing races from the frame headstock.
9. Remove the inner race and dust seal from the bottom yoke using a press or puller.

Inspection

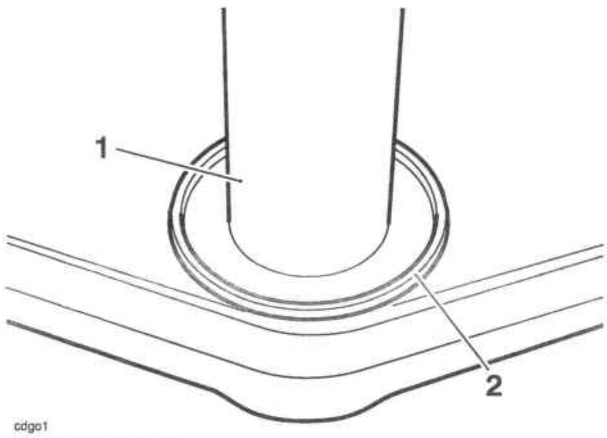
Warning

Only remove raised witness marks from within the frame. Removal of material below any raised areas will reduce the level of interference between the frame and the bearings. Loss of interference could cause the bearing to become loose in the frame leading to loss of motorcycle control and an accident.

1. Examine the frame for any raised witness marks caused by the removal process. Remove any such marks with fine emery paper or a gentle file.

Installation

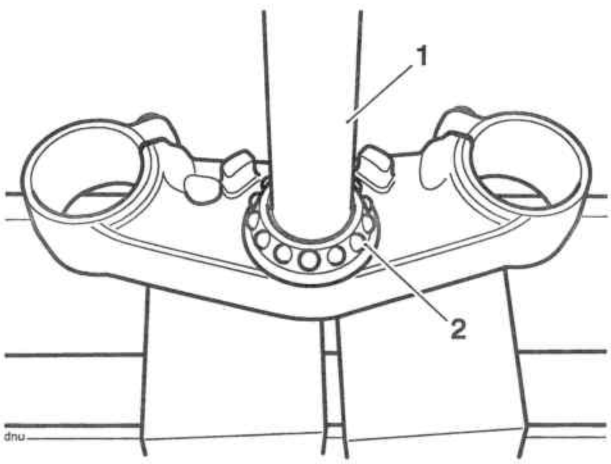
1. Fit a new dust seal to the steering stem on the bottom yoke.



1. Steering stem
2. Dust shield

> **⚠ Caution**
>
> Protect the threads of the bottom yoke when using a press or puller as damaged threads may mean replacing the yoke completely.

2. Press a new lower bearing inner race onto the steering stem of the bottom yoke.



1. Bearing
2. Bottom yoke
3. Press bed

3. Evenly and progressively drive a new complete upper bearing into the frame headstock.
4. Lubricate the lower bearing using multi-purpose grease.
5. Drive a new lower outer bearing into the frame headstock.
6. Insert the lower yoke to the frame, fit the upper bearing and race, and retain with the adjuster nut.
7. Adjust the headstock bearings (see page *13-12*).
8. Locate the upper yoke to the steering stem. Install but do not fully tighten the headstock top nut at this stage.
9. Fit the forks (see page *13-5*).
10. Tighten the headstock top nut to **90 Nm**.
11. Refit the steering damper (see page *13-16*).
12. Check that no freeplay exists in the headstock bearings. Adjust as necessary (see page *13-12*).

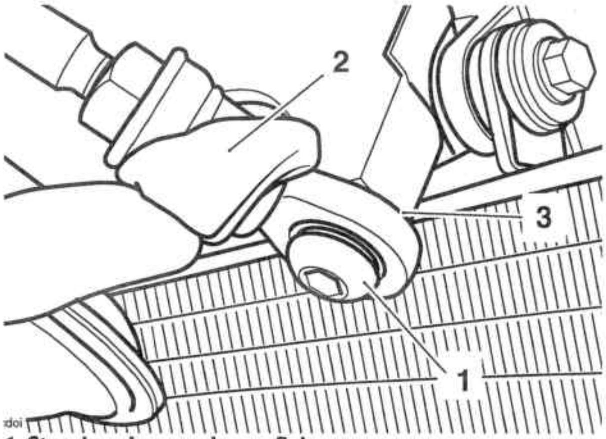
Steering Damper

Removal

Warning

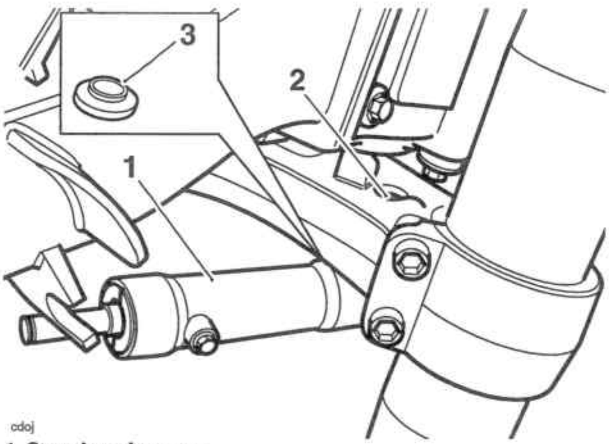
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help to prevent it falling and causing injury to the operator or damage to the motorcycle.

1. Reposition the damper rod boot and remove the steering damper lower fixing. Noting its position, collect the steel washer located between the damper and the frame bracket.



1. Steering damper lower fixing
2. Damper rod boot
3. Steel washer position

2. Release the steering damper upper fixing and remove the steering damper. Noting its orientation, collect the flanged sleeve located between the damper body and the lower yoke.



1. Steering damper
2. Upper fixing
3. Flanged sleeve

Installation

1. Installation is the reverse of removal noting the following:

Note:

- **Refit the steel washer as noted during removal.**
- **Refit the flanged sleeve as noted during removal.**
- **Tighten the fixings to 18 Nm.**
- **Refit the boot over the damper rod fixing.**

14 Brakes

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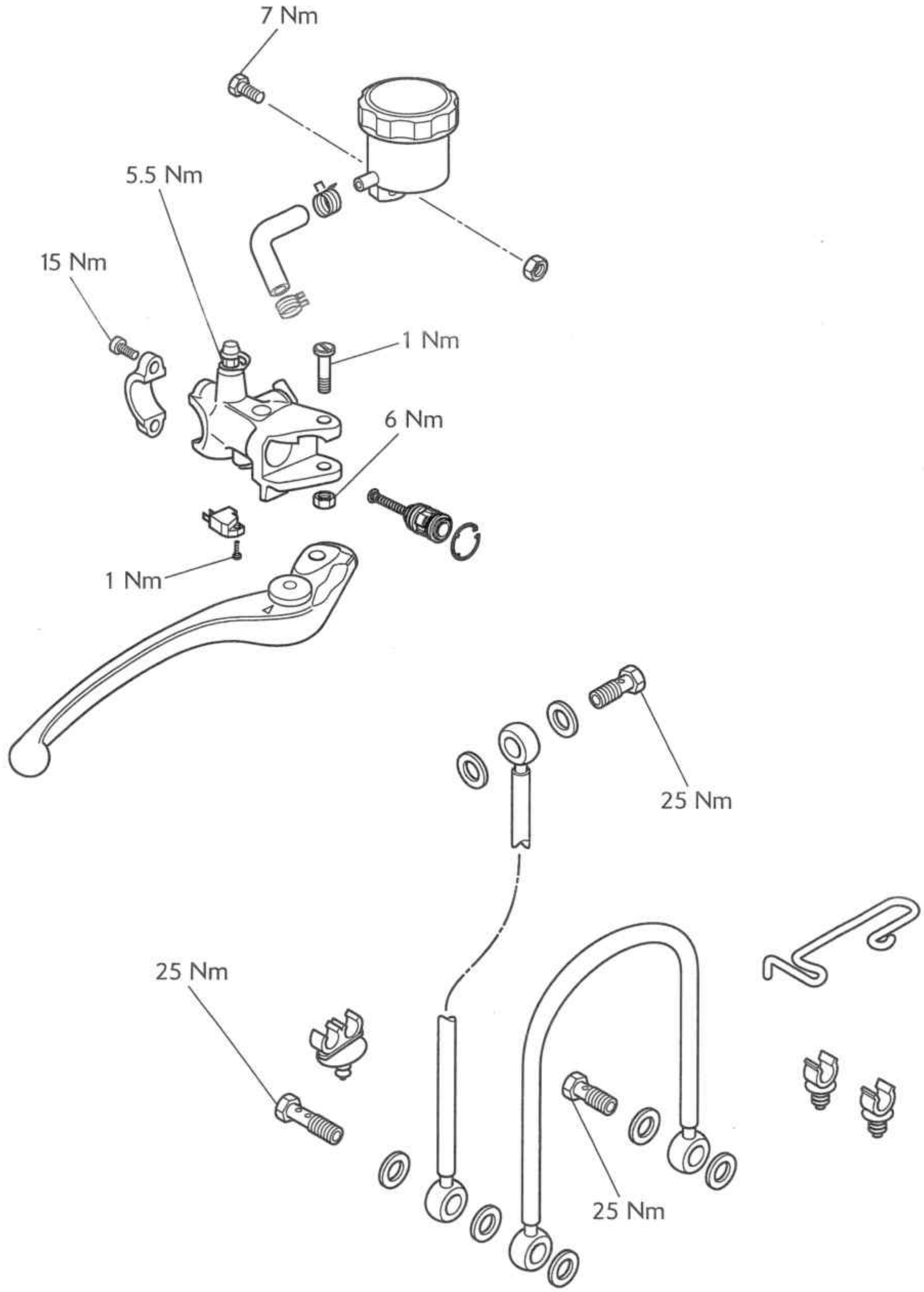
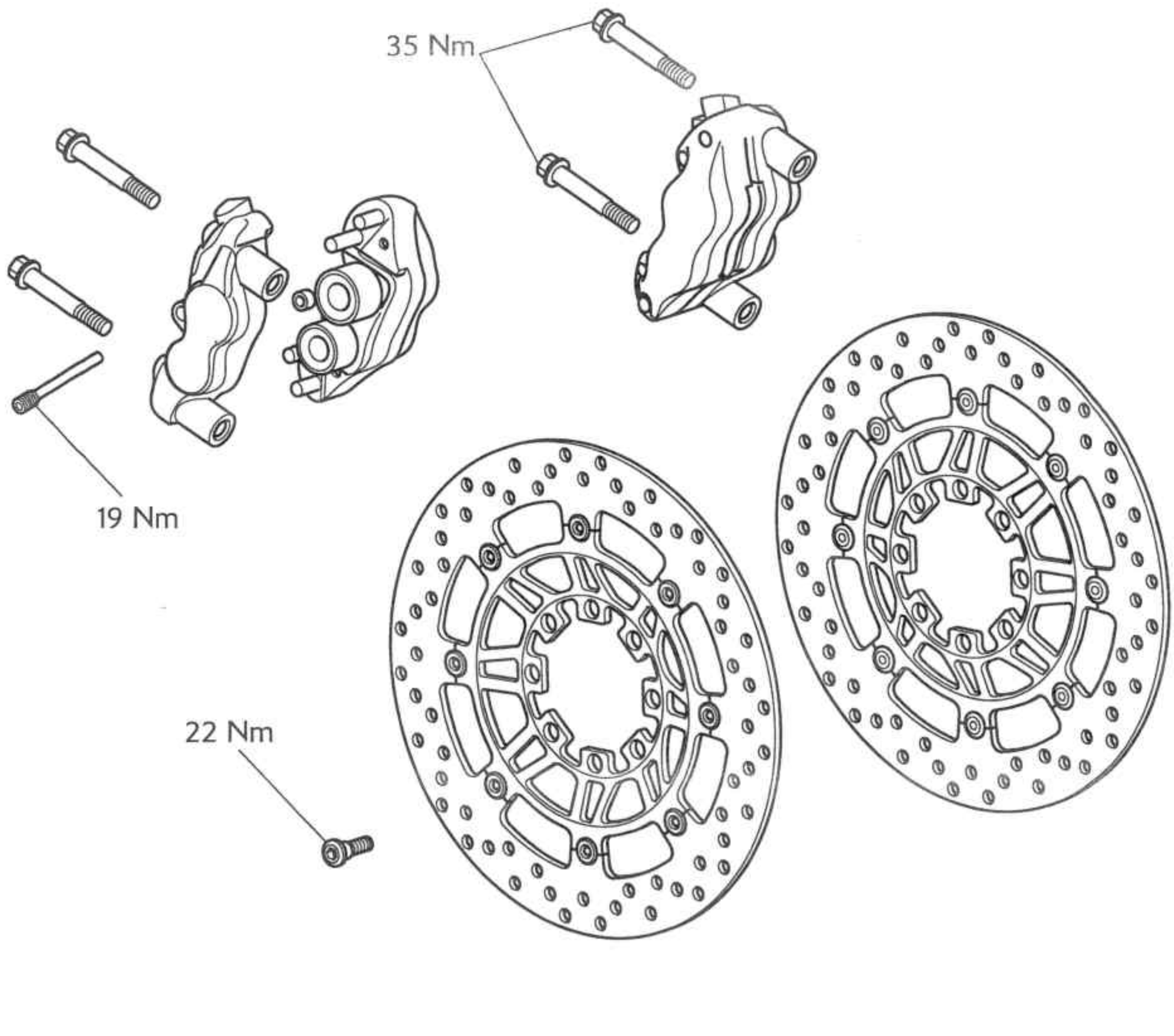
Brakes

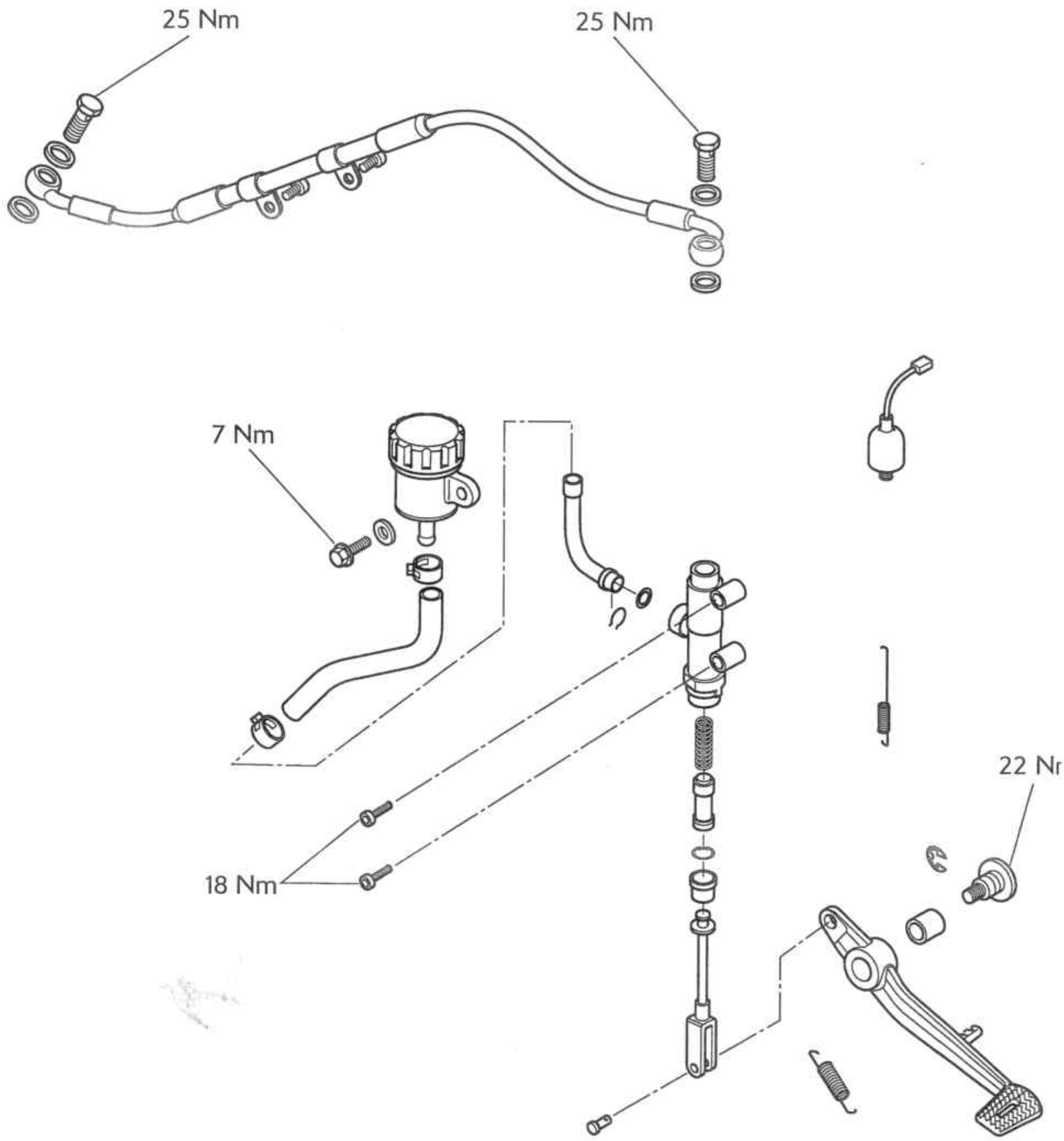
Exploded View - Front Brake Master Cylinder



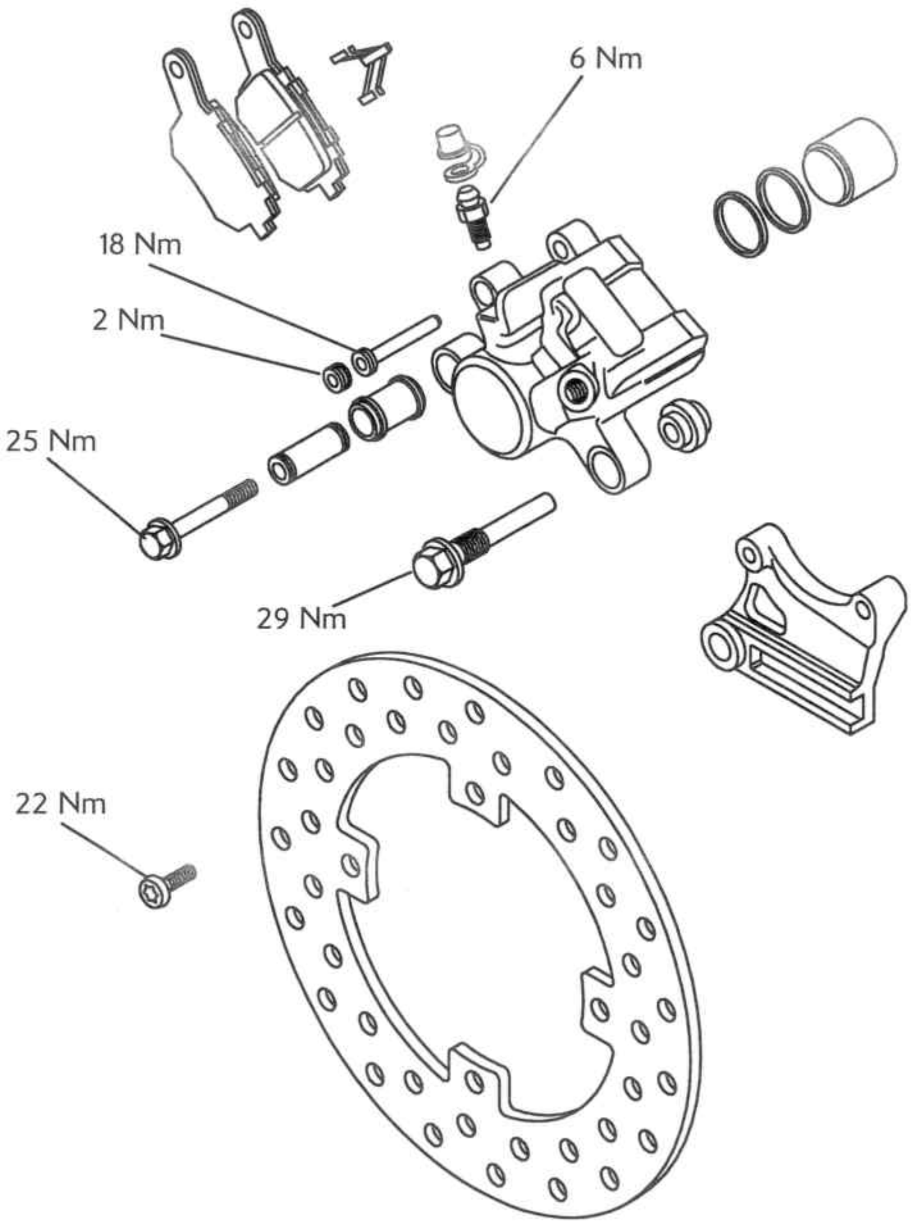
Exploded View - Front Brake Caliper



Exploded View - Rear Brake Master Cylinder



Exploded View - Rear Brake Caliper



Braking System Maintenance Safety Precautions

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.

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

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

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

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

Check regularly for brake hose damage.

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

Warning

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

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

It is dangerous to operate the motorcycle under such conditions and remedial action must be taken by your authorised Triumph dealer before riding the motorcycle. Failure to take remedial action may reduce braking efficiency leading to an accident.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Failure to change the brake fluid at the interval specified in the scheduled maintenance chart 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.

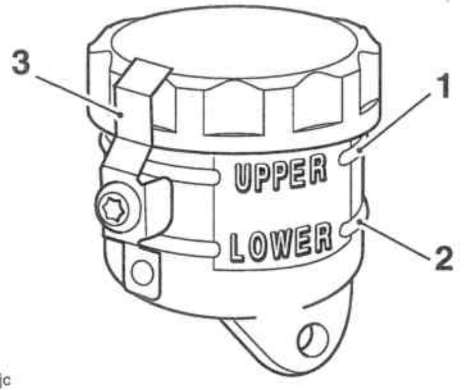
Fluid Level Inspection

Warning

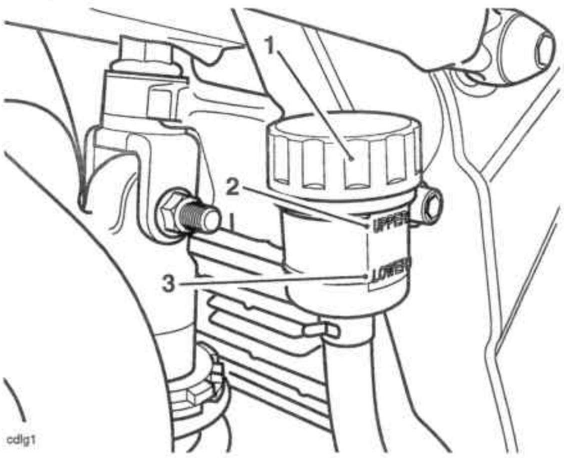
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

In accordance with the scheduled maintenance chart, inspect the brake fluid level in the front and rear master cylinder reservoirs.

1. Ensure that the brake fluid level in the front and rear brake fluid reservoirs is between the upper and lower level lines (reservoir held horizontal).



1. Front reservoir upper level
2. Front reservoir lower level
3. Safety clip



1. Rear reservoir
2. Rear reservoir upper level
3. Rear reservoir lower level

Changing Brake Fluid

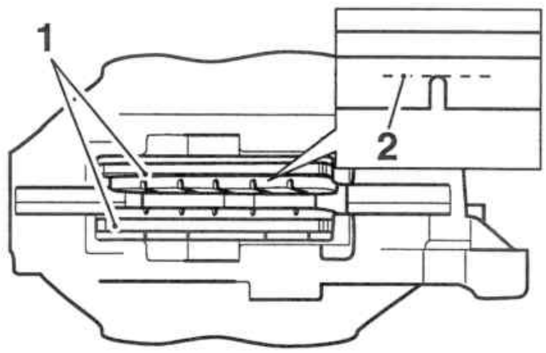
Brake fluid should be changed at the interval specified in the scheduled maintenance chart.

Brake Pads

Front and rear pad wear is automatically compensated for and has no effect on brake lever or pedal action.

Brake Wear Inspection

In accordance with the scheduled maintenance chart, inspect the brake pads for wear. The minimum thickness of lining material for any front or rear brake pad is **1.5 mm**. If any pad has worn to the bottom of the groove in the pad centre, replace all the brake pads on that wheel.



cbmz

1. Lining material thickness
2. Centre groove

Warning

Do not replace individual brake pads, replace both pads in the brake caliper. On the front where two calipers are mounted on the same wheel, all the pads in both calipers must be replaced together. Replacing individual pads will reduce braking efficiency and may cause an accident.

Bleeding the Front Brakes, Renewing Brake Fluid

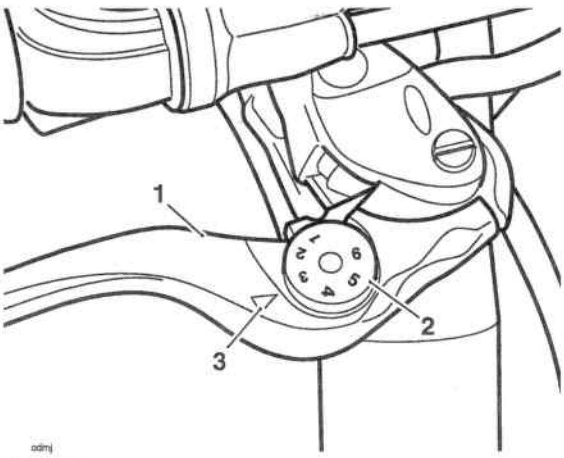
Warning

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:

- **The master cylinder should always be bled last. Bleed each caliper in turn before bleeding the master cylinder.**

1. 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. Lever
2. Adjuster wheel
3. Triangular mark

2. Turn the handlebars to bring the fluid reservoir to a level position.
3. Remove the screw from the reservoir cover.

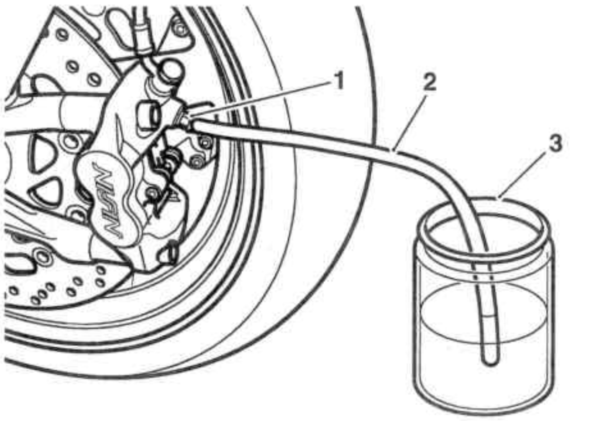
Warning

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 that has been opened for any period of time. Always check for fluid leakage around hydraulic fittings and for damage to hoses. A dangerous riding condition leading to loss of motorcycle control and an accident could result if this warning is ignored.

Caution

To prevent paint damage, do not spill brake fluid onto any area of the bodywork. Spilled brake fluid will damage paintwork.

4. Carefully remove the reservoir cover taking care not to spill any fluid.
5. Check the condition of the sealing diaphragm for the reservoir. Replace if necessary.
6. Remove the rubber cap from the bleed nipple on the right hand caliper.
7. 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.



1. Bleed nipple
2. Bleed tube
3. Container

8. Release the bleed nipple.

Note:

- **During bleeding, do not allow the fluid level to fall below the lower level mark in the reservoir. If the fluid level is allowed to fall below this mark, air may enter the system and the sequence of bleeding must be repeated.**

9. Get an assistant to slowly pull the brake lever to the handlebar.
10. With the lever held fully against the handlebar, close the bleed nipple. Once the bleed nipple is closed, release the brake lever.
11. Repeat steps 9 and 10 until no more air appears in the bleed tube.
12. When all air has been expelled from the system, hold the lever fully against the handlebar and close the bleed nipple.

13. Remove the transparent bleed tube.

Note:

- **Maintain the brake fluid level between the upper and lower reservoir levels whilst bleeding is being carried out.**

14. Tighten the bleed nipple to **6 Nm**.
15. Remove the bleed tube.
16. Replace the bleed nipple cap.
17. Fill the reservoir to the upper level with new DOT 4 fluid.

Warning

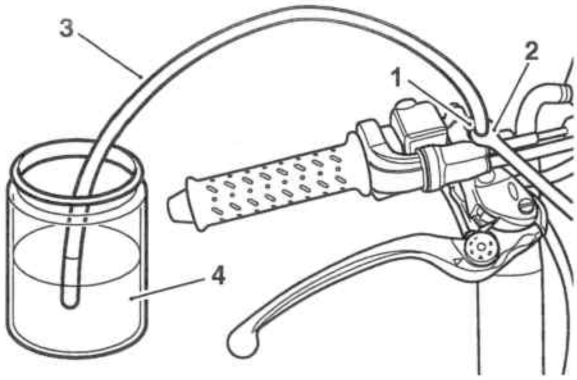
Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to loss of motorcycle control and an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

Caution

To prevent paint damage, do not spill brake fluid onto any area of the bodywork. Spilled brake fluid will damage paintwork.

18. Repeat the bleed procedure for the left hand caliper.
19. Repeat the bleed procedure for the bleed nipple on the master cylinder. Tighten the bleed nipple to **5.5 Nm.**



1. Bleed nipple
2. Spanner
3. Bleed tube
4. Container

20. When both calipers and the master cylinder have been bled, ensure the brake lever operation has a firm resistive feel to it, does not feel spongy and that the lever cannot be pulled directly back to the handlebar. Take remedial action as necessary.
21. Refit the diaphragm and reservoir cover. Tighten the screw to **1 Nm**.

Warning

Always return the lever adjuster to the original setting as noted in paragraph 1. Operating the motorcycle with lever settings that are unfamiliar may lead to loss of control or an accident.

22. Reset the brake lever adjuster to the original setting.
23. Check the operation of the front brake. Rectify as necessary.

Warning

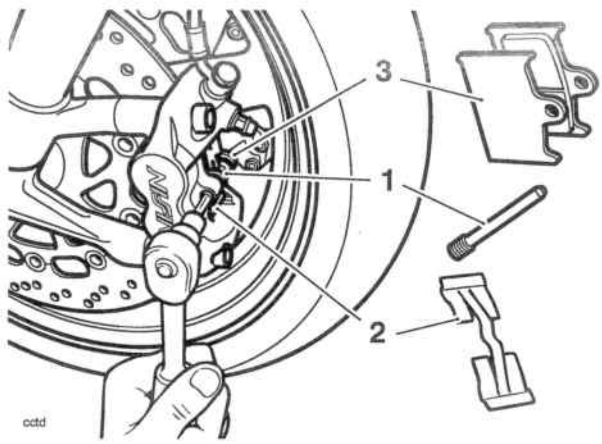
It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

Front Brake Pads

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. Retaining pin
2. Anti-rattle spring
3. Brake pads

1. Remove the brake pad retaining pin after removing the 'R' clip from its inner end. Inspect the pad retaining pin for damage.
2. Remove the anti-rattle spring and inspect the spring for damage.

Caution

Never lever directly against the disc, caliper or the pad lining material as this will damage these components. Always use a levering tool made from a soft material which will not cause damage to the load bearing surfaces.

Brake fluid will be displaced as the caliper pistons are compressed. To prevent body damage, ensure that the displaced fluid does not come into contact with any part of the bodywork.

3. Ease the brake pads apart to force the caliper pistons back to allow withdrawal of the pads.
4. Remove both brake pads and inspect for damage and wear beyond the service limit.

Note:

- **Complete the assembly of the brake pads to one caliper (see assembly for details) before removing the pads from the other caliper.**

Installation

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.

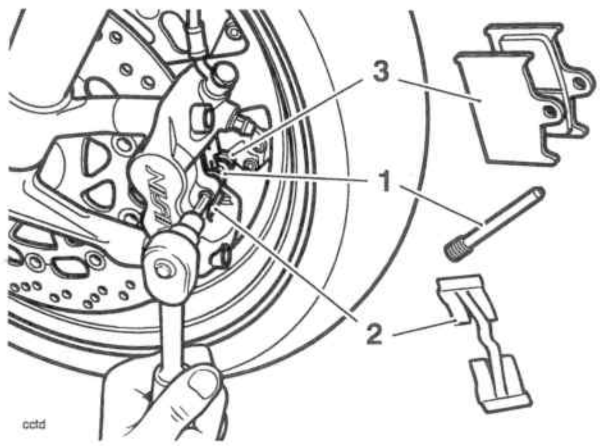
Damage caused by contact with mineral based grease may reduce braking efficiency resulting in an accident.

1. Fit new brake pads as an axle set or, if all the pads are in a serviceable condition, clean the pad grooves before refitting all pads in their original positions.

Warning

Do not apply more than a minimum coating of grease to the pad retaining pins. Excess grease may contaminate the brake pads, hydraulic seals and discs causing reduced braking efficiency and an accident.

2. Lubricate the pad retaining pins using a minimum amount of proprietary high temperature 'Copperslip' type grease.
3. Fit the anti-rattle spring over the pads and push down in the centre to allow the pad retaining pin to slide across the top of the spring.
4. Tighten the pad retaining pin to **19 Nm**, and secure with the 'R' clip.



1. Retaining pin
2. Anti-rattle spring
3. Brake pads

5. Pump the brake lever to correctly position the caliper pistons.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

6. Check the front brake fluid level and top up as required with new DOT 4 fluid.
7. Check for correct brake operation. Rectify as necessary.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Front Brake 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.

Caution

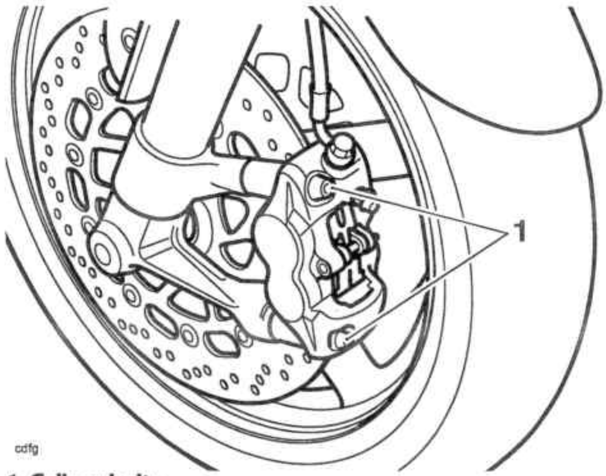
To prevent body damage, do not spill brake fluid onto any area of the bodywork.

1. Disconnect the brake hose at the caliper (two hoses on right hand caliper), and place the free end of the hose(s) in a suitable container to collect brake fluid.

Note:

- **If the calipers are to be removed for access only, do not remove the brake pads.**

2. Remove the brake pads (see page *14-11*).
3. Remove the two caliper bolts.



1. Caliper bolts

4. Manoeuvre the caliper clear of the disc, taking care not to damage the wheel.

Disassembly

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. Undo and remove the four bolts which secure the two halves of the brake caliper together. Discard the bolts.
2. Carefully split the two halves of the caliper then remove and discard the joint seal.
3. Cover a caliper half with a clean, heavy cloth and, using compressed air, remove the pistons one at a time.

Warning

Ensure the seal grooves in the caliper bores are not damaged during the removal of the seals. Damage to the seal grooves may allow brake fluid to leak past the seals resulting in a dangerous riding condition leading to loss of motorcycle control and an accident.

4. Remove the old piston seals and dust seals then thoroughly clean and dry the caliper bores and pistons. Discard the old seals, these must not be re-used.

Inspection

1. Check the pistons and caliper bores for corrosion, scoring and damage. Renew as necessary.

Warning

Always renew caliper seals and pistons after removal from the caliper. An effective hydraulic seal can only be made if new components are used.

A dangerous riding condition leading to an accident could result if this warning is ignored.

2. Inspect the brake pads for damage and wear beyond the service limit. Renew as necessary.

Assembly

Warning

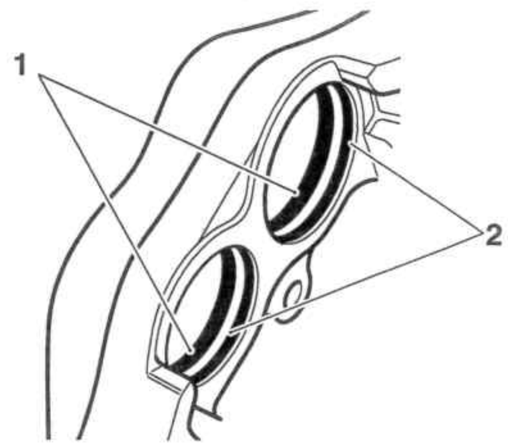
Never use mineral based grease in any part of the braking system or in any area where contact with the braking system is possible. Mineral based grease will damage the hydraulic seals in the calipers and master cylinders.

A dangerous riding condition leading to an accident could result if this warning is ignored.

1. Lubricate the piston seals with clean DOT 4 brake fluid. Fit the piston seals and the dust seals to the caliper bores in the positions shown below.

Note:

- **The piston seals are slightly thicker than the dust seals.**



1. Piston seals
2. Dust seals

Warning

Ensure that the caliper bores do not become scratched during piston removal and assembly. Ensure that the pistons remain square to their bores during fitment otherwise damage to the caliper could result.

A dangerous riding condition leading to an accident could result if this warning is ignored.

2. Carefully refit the dry pistons fully into the caliper bores by hand.
3. Once all seals and pistons have been fitted, carefully clean the mating faces of both calipers, then fit a new joint seal to the recess in one half of the caliper.

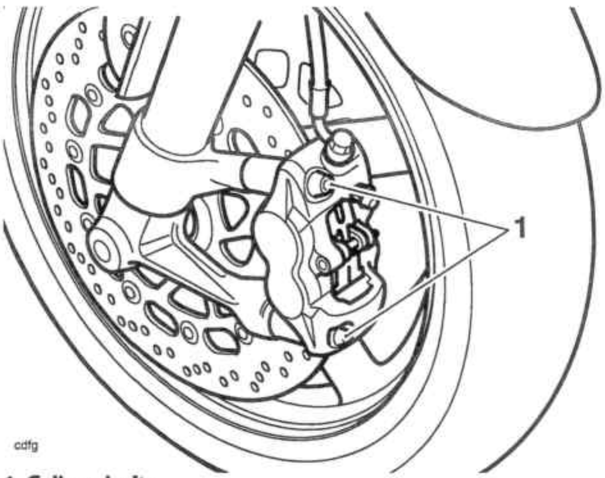
Warning

Ensure the mating faces of the caliper halves are clean and free from dust prior to assembly. Failure to ensure that the mating faces are clean and free from dust will result in a dangerous riding condition leading to loss of motorcycle control and an accident.

4. Apply a small drop of Loctite hydraulic sealant 569 to the threads of new caliper bolts and secure the two halves of the caliper together. Tighten the caliper bolts to **24 Nm**.

Installation

1. Position the caliper over the disc and tighten the caliper bolts to **35 Nm**.



1. Caliper bolts

2. Fit the brake pads (see page *14-11*).
3. Connect the brake hose(s) to the caliper incorporating new sealing washers on each side of all hose connections.
4. Tighten the banjo bolt to **25 Nm**.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

5. Fill the master cylinder with new, DOT 4 brake fluid from a sealed container.
6. Bleed the front brake line (see page *14-9*).
7. Check for correct brake operation.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Front Discs

⚠ 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.

Wear

1. Replace any brake disc if worn beyond the service limit or that exceeds the disc run-out limit.

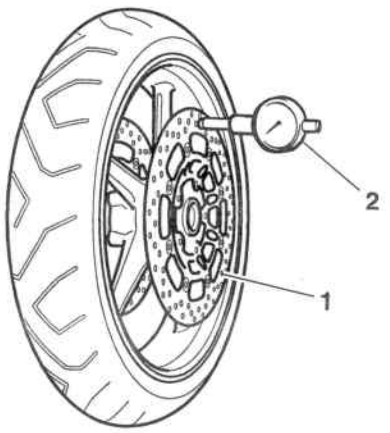
Front Disc Thickness

Standard:	4.5 mm
Service Limit:	4.0 mm

Disc Run-out

Service Limit:	0.3 mm

Measure disc run-out using an accurate dial gauge mounted on a surface plate.



1. Disc
2. Dial gauge

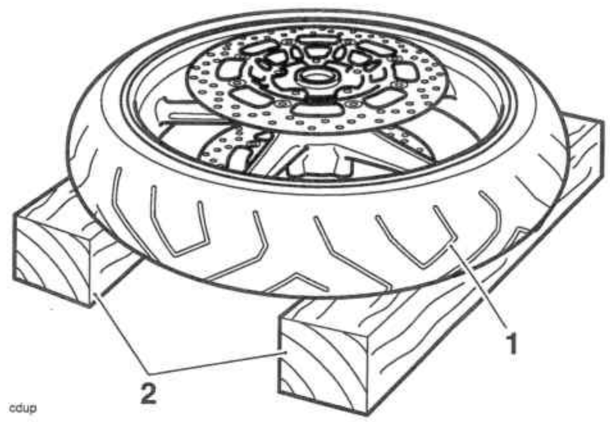
Removal

⚠ Warning

Do not renew front brake discs individually. Discs must always be renewed in pairs even if one of a pair is serviceable.

A dangerous riding condition leading to an accident could result if this warning is ignored.

2. Remove the front wheel (see page *15-6*).
3. Support the wheel on blocks as illustrated to avoid damage to the wheel centre.



1. Wheel
2. Support blocks

4. Remove and discard the bolts.
5. Detach the disc.
6. Repeat for the other disc.

Installation

1. Locate the first disc to the wheel.
2. Fit new bolts and tighten to **22 Nm**.
3. Fit the other disc in the same way.
4. Refit the front wheel (see page *15-7*).
5. Check for correct brake operation. Rectify as necessary.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Front Brake Master Cylinder

Removal

Warning

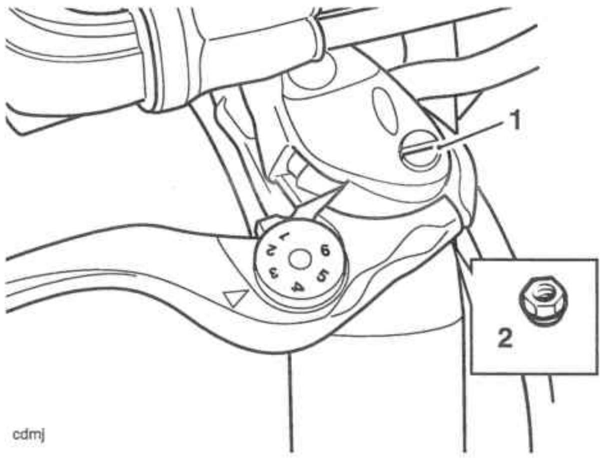
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.

Caution

To prevent body damage, do not spill brake fluid onto any area of the bodywork.

3. To drain the fluid from the master cylinder, attach a tube to the right hand caliper bleed nipple, slacken the nipple and allow the fluid to drain into a suitable container. Operate the brake lever until all fluid has been expelled.
4. Note the setting of the brake lever adjuster to ensure it is returned to the same position when the overhaul operation is complete.
5. Remove the pivot locknut and bolt securing the brake lever to the master cylinder, and remove the lever.

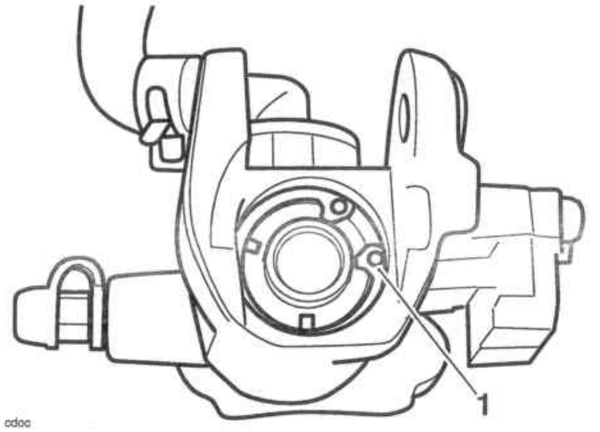


1. Pivot bolt
2. Nut

6. Disconnect from the master cylinder the:
    - brake hoses,
    - brake light switch connections.
7. Release the clamp screws from the handlebar to remove the master cylinder.

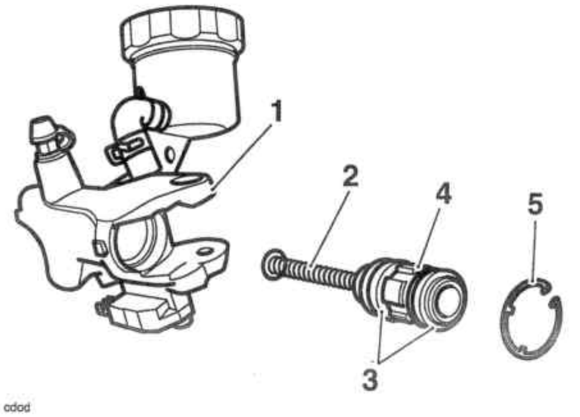
Disassembly

1. Support or remove the reservoir.
2. Detach the boot and push-rod from the lever end of the cylinder.
3. Remove the circlip from beneath the boot.



1. Circlip

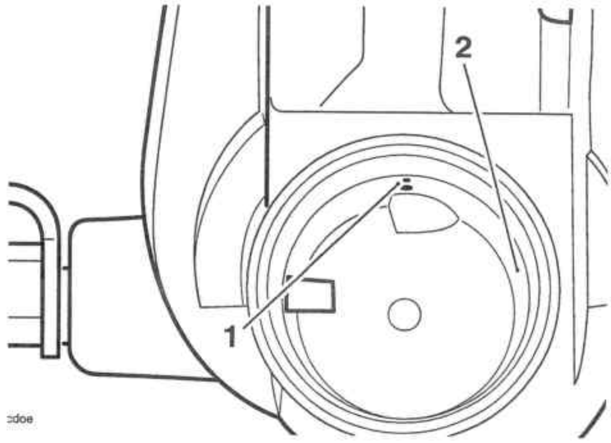
4. Remove the piston set from the master cylinder bore noting the relative position of the seals and piston components.



1. Master cylinder
2. Spring
3. Piston seals
4. Piston
5. Circlip

Inspection

1. Check the following for wear, damage, cracks or deterioration:
   - Cylinder bore
   - Dust cover
   - Spring
   - Piston
   - Pivot Bolt
2. Always renew the piston and seal set if the cylinder is dismantled.
3. Check that the two ports in the master cylinder bore are not blocked.



1. Ports
2. Master cylinder bore

Assembly

> **Warning**
>
> Never use mineral based grease in any part of the braking system or in any area where contact with the braking system is possible. Mineral based grease will damage the hydraulic seals in the calipers and master cylinders.
>
> A dangerous riding condition leading to an accident could result if this warning is ignored.

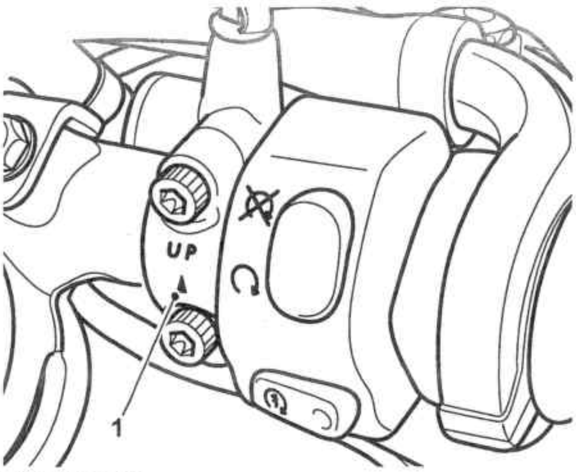
1. Lubricate the piston and cylinder with new, clean brake fluid.

Warning

Ensure that the piston and piston seal are fitted facing the same way as noted during removal. A dangerous riding condition leading to an accident could result from incorrect assembly of the master cylinder.

2. Fit the new piston set into the master cylinder and retain with a new circlip.
3. Refit the master cylinder boot.

Installation



1. Arrow mark

1. Locate the master cylinder to the handlebars and position the clamp with the 'UP' arrow pointing upwards. Do not tighten the clamp bolts at this stage.
2. Connect the brake hose to the master cylinder incorporating new sealing washers. Tighten the banjo bolt to **25 Nm**.
3. Align the master cylinder/clamp split line with the dot mark on the handlebar.
4. Tighten the clamp bolts, upper first and then the lower to **15 Nm**.
5. Connect the brake light switch.
6. Position the brake lever ensuring that the pivot boss is correctly aligned to the push rod. Fit and tighten the pivot bolt to **1 Nm**, and the locknut to **6 Nm**.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

7. Fill and bleed the front brakes (see page *14-9*).

Warning

Always return the lever adjuster to the original setting noted during removal. Operating the motorcycle with lever settings which are unfamiliar may lead to loss of control or an accident.

8. Reset the brake lever adjuster to the original setting.
9. Examine the system for correct operation and fluid leaks. Rectify as necessary.
10. Connect the battery, positive (red) lead first.
11. Refit the rider's seat (see page *16-11*).
12. Check for correct brake operation. Rectify as necessary.

Warning

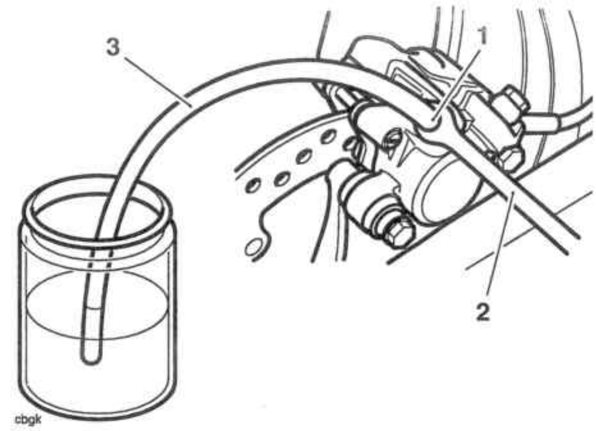
It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Bleeding the Rear Brakes, Renewing Brake Fluid

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 cap from the rear bleed nipple.
2. Attach a transparent tube to the bleed nipple.



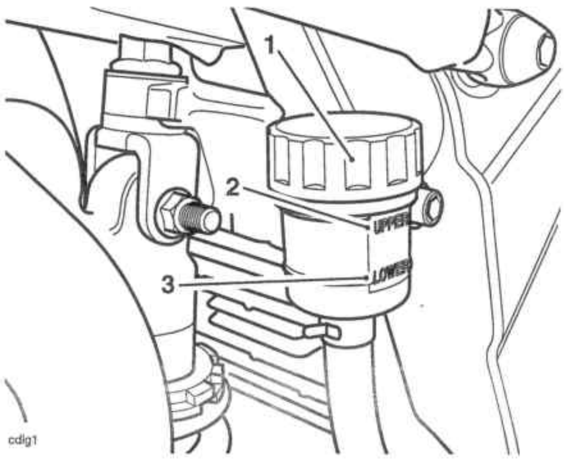
1. Bleed nipple
2. Spanner
3. Bleed tube

3. Place the other end of the tube in a suitable receptacle containing new brake fluid.

Caution

To prevent body damage, do not spill brake fluid onto any area of the bodywork.

4. Unscrew and remove the rear brake reservoir cover taking care not to spill any fluid.



1. Rear reservoir
2. Rear reservoir upper level
3. Rear reservoir lower level

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 opened for any period of time. Always check for fluid leakage around hydraulic fittings and for damage to hoses.

A dangerous riding condition leading to an accident could result if this warning is ignored.

5. Check the condition of the sealing diaphragm. Replace the diaphragm as necessary.
6. Release the bleed nipple.

Note:

- **During bleeding, do not allow the fluid level to fall below the lower level mark in the reservoir. If the level is allowed to fall below this mark, air may enter the system and the sequence of bleeding must be repeated.**

7. Slowly depress the brake pedal and, holding the pedal fully down, close the bleed nipple.
8. Repeat steps 6 and 7 until no more air appears in the bleed tube.
9. Maintain the brake fluid level between the upper and lower reservoir levels whilst bleeding is being carried out.
10. When all air has been expelled from the system, hold down the brake pedal and close the bleed nipple. Tighten the nipple to **6 Nm**.

11. Fill the reservoir to the maximum level with new DOT 4 fluid.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

12. Fit the reservoir cover and diaphragm. Check for correct diaphragm fitment before final tightening of the cover.
13. Remove the bleed tube from the nipple.
14. Replace the bleed nipple cap.
15. Check for correct brake operation. Rectify as necessary.

Warning

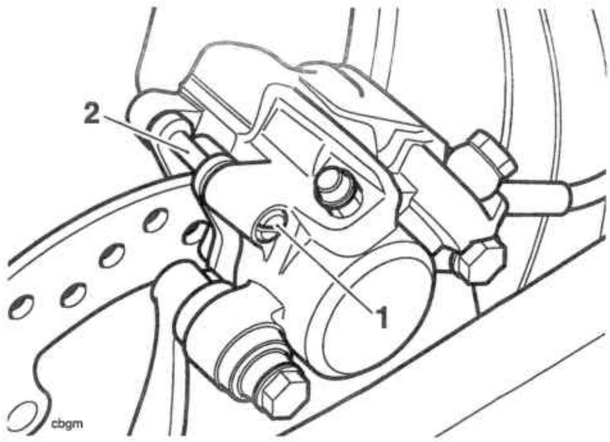
It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Rear Brake Pads

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. Push the brake caliper inwards towards the wheel in order to displace the caliper piston.
2. Remove the plug protecting the pad retaining pin.



1. Plug
2. Pad retaining pin

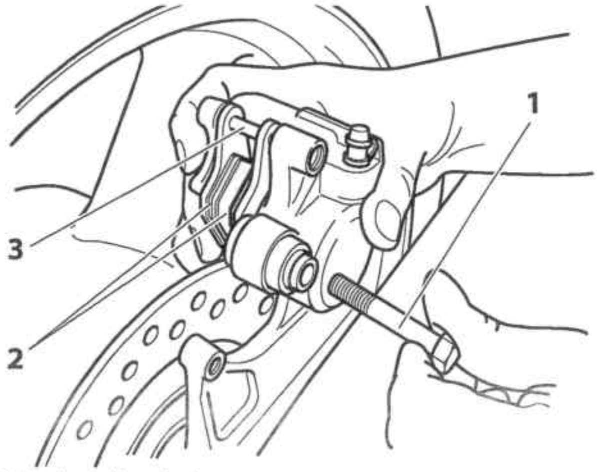
Note:

- **Before removing the brake pads, note the relationship of the pads to the caliper and ensure that, on assembly, they are fitted in the same way.**

Warning

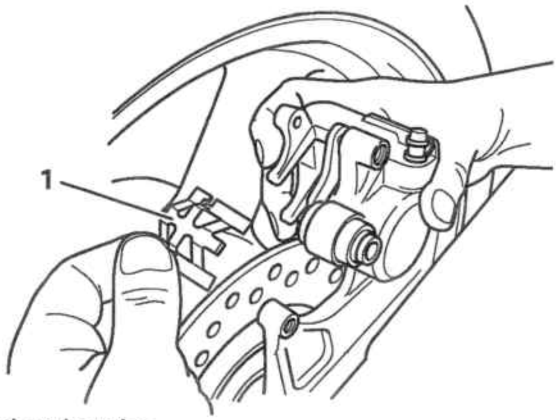
Do not allow the calliper to hang on the brake hoses as this may damage the hoses and could lead to loss of motorcycle control and an accident.

3. Remove the brake caliper bolts and raise the caliper.



1. Brake caliper bolt
2. Brake pads
3. Pad retaining pin

4. Remove the pad retaining pin and remove the pads.
5. Remove the anti-rattle spring and inspect for damage.



1. Anti-rattle spring

Installation

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 mineral based grease may reduce braking efficiency resulting in an accident.

Caution

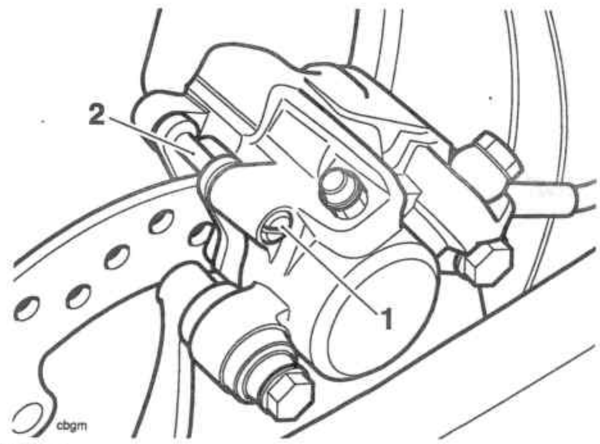
Brake fluid will be displaced as the caliper pistons are compressed. To prevent body damage, ensure that the displaced fluid does not come into contact with any part of the bodywork or the rear wheel.

1. If fitting new pads, use hand pressure to compress the caliper piston fully into its bore.
2. Fit the anti rattle spring into the caliper.
3. Renew the brake pads as a pair or, if both pads are in a serviceable condition, clean the pad grooves before fitting them.
4. Fit the brake pads to the caliper in the positions noted during removal.
5. Lubricate the pad retaining pin using a minimum amount of proprietary high temperature 'Copperslip' type grease.
6. Install the pad retaining pin.

Warning

Do not apply more than a minimum coating of grease to the pad retaining pins. Excess grease may contaminate the brake pads, hydraulic seals and discs causing reduced braking efficiency and an accident.

7. Lower the caliper over the brake disc ensuring that the pads remain in the correct positions.



1. Plug
2. Pad retaining pin

8. Fit the caliper bolts and tighten to **25 Nm** (M8 bolt) and **29 Nm** (M12 bolt).
9. Tighten the pad retaining pin to **19 Nm**.
10. Fit the retaining plug and tighten to **2 Nm**.
11. Pump the brake pedal to correctly position the caliper pistons.

12. Check the brake fluid level in the rear reservoir and top-up as required with new D.O.T. 4 fluid.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

13. Check for correct brake operation. Rectify as necessary.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Rear Brake Caliper

Removal

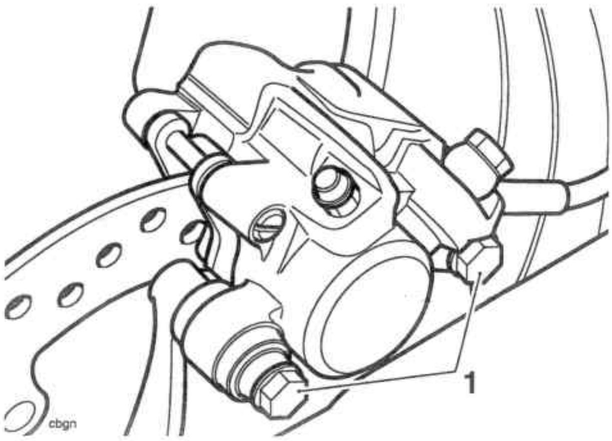
Warning

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.

Caution

To prevent body damage, do not allow brake fluid to contact any area of the bodywork or the rear wheel.

1. Disconnect the rear brake hose at the caliper and place the free end of the hose in a suitable container to collect the brake fluid.
2. Remove the caliper mounting bolts.
3. Remove the brake caliper assembly.



1. Caliper mounting bolts

Disassembly

1. Remove the plug protecting the pad retaining pin.
2. Remove the pad retaining pin.
3. Remove the brake pads and anti-rattle spring.

Warning

To prevent injury, never place fingers or hands inside the caliper opening when removing the piston. Always wear eye, hand and face protection when using compressed air. Eye, face and skin damage will result from direct contact with compressed air.

4. 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, remove the piston.

Inspection

1. Check the piston and caliper bore for corrosion, scoring and damage. Renew as necessary.

Warning

Always renew caliper seals and pistons after removal from the caliper. An effective hydraulic seal can only be made if new components are used.

A dangerous riding condition leading to an accident could result if this warning is ignored.

2. Inspect the brake pads for damage and wear beyond the service limit. Renew as necessary.

Assembly

Warning

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

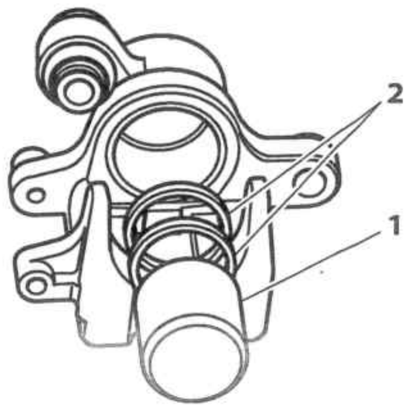
A dangerous riding condition leading to an accident could result if this warning is ignored.

Warning

Ensure that the caliper bores do not become scratched during removal and assembly.

A dangerous riding condition leading to an accident could result if this warning is ignored.

1. Fit new fluid seals to the caliper. Apply brake fluid to the outside of the caliper piston and fluid seal.



1. Piston
2. Seals

Warning

Ensure that the piston does not tip during assembly as this could damage the caliper.

A dangerous riding condition leading to an accident could result if this warning is ignored.

2. Carefully push the piston into the caliper by hand.
3. Install the anti-rattle spring into the caliper.

Warning

Do not apply more than a minimum coating of grease to the pad retaining pins. Excess grease may contaminate the brake pads, hydraulic seals and discs causing reduced braking efficiency and an accident.

4. Position the brake pads in the caliper.
5. Lubricate the pad retaining pin using a minimum amount of proprietary high temperature 'Copperslip' type grease.
6. Fit and tighten the pad retaining pin to **19 Nm**.
7. Fit the retaining plug and tighten to **2 Nm**.

Installation

1. Position the caliper over the disc ensuring the pads are correctly aligned on both sides of the disc.
2. Fit the caliper retaining bolts and tighten to **25 Nm** (M8 bolt) and **29 Nm** (M12 bolt).
3. Connect the brake hose to the caliper incorporating new washers on each side of the banjo bolt.
4. Tighten the banjo bolt to **25 Nm**.

Warning

Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.

Observe the brake fluid handling warnings given earlier in this section of the manual.

5. Fill the master cylinder with new, DOT 4 brake fluid from a sealed container.
6. Bleed the rear brake (see page 14-19).
7. Check for correct brake operation. Rectify as necessary.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

Rear Brake Disc

Wear

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. Replace any brake disc worn beyond the service limit or that exceeds the disc run-out limit.

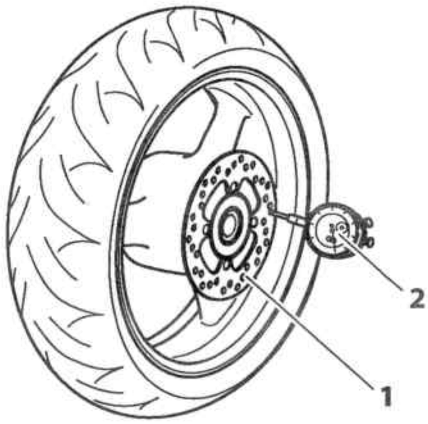
Rear Disc Thickness

Standard:	5.0 mm
Service Limit:	4.5 mm

Disc Run-out

Service Limit:	0.30 mm

Measure disc run-out using an accurate dial gauge mounted on a surface plate.



1. Disc
2. Dial gauge

Note:

- **Details of rear brake disc removal and installation can be found in the wheel section.**

Rear Master Cylinder

Removal

⚠ Warning

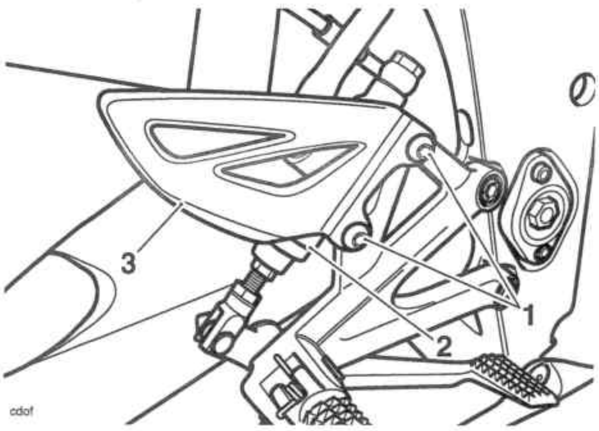
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.

⚠ Caution

To prevent body damage, do not spill brake fluid onto any area of the bodywork or wheels.

3. Drain the fluid from the master cylinder by bleeding the system at the rear caliper until all fluid has been expelled.
4. Remove the clip and washer from the clevis pin at the lower end of the brake pushrod.
5. Remove the clevis pin.
6. Disconnect from the master cylinder the:
   - **the rear brake hose (noting orientation),**
   - **the reservoir hose.**



1. Master cylinder fixings
2. Master cylinder
3. Heel guard

7. Remove the screws securing the master cylinder and heel guard to the frame to release the master cylinder.

Disassembly

1. Remove the boot from the cylinder and pushrod.
2. Remove the circlip retaining the pushrod to the cylinder.
3. Remove the pushrod and piston set from the master cylinder bore, noting the relative position of the seals and piston components.

Inspection

1. Visually inspect the master cylinder bore for wear, scratches or corrosion. Replace as necessary.
2. Check the piston and cylinder bore for damage, wear or deterioration. Replace as necessary.
3. Always renew the piston and seal set if the cylinder is dismantled.
4. Examine the pushrod for bends and damage. Replace as necessary.

Assembly

⚠ Warning

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

A dangerous riding condition leading to an accident could result if this warning is ignored.

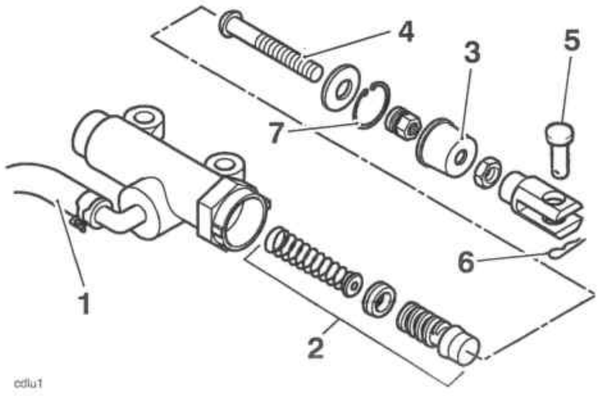
1. Clean the master cylinder bore, piston and seals, with new brake fluid.
2. Ensure all ports are clear of obstruction.

⚠ Warning

Ensure that the piston and piston seal are fitted facing the same way as noted during removal. A dangerous riding condition leading to an accident could result from incorrect assembly of the master cylinder.

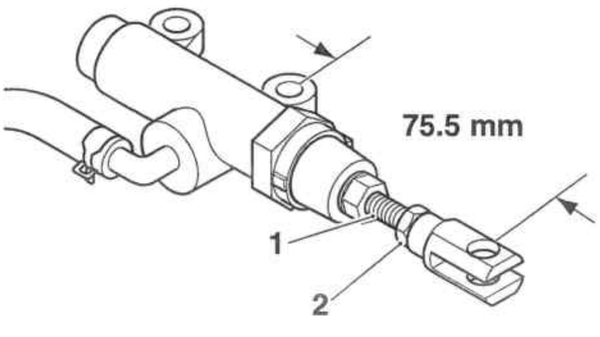
3. Install the spring and piston set together.
4. Apply a small amount of brake grease to the pushrod.
5. Install the pushrod in the master cylinder and retain with a new circlip.

6. Refit the boot.



1. Reservoir hose
2. Piston set
3. Dust boot
4. Push rod
5. Clevis pin
6. Clip
7. Circlip

7. If the pushrod has been disassembled, adjust the lenght of the pushrod as shown below:



1. Pushrod
2. Locknut

8. Set the pushrod free length to 75.5 mm.
9. Tighten the locknut to **18 Nm**.

Installation

1. Fit the reservoir hose to the master cylinder.
2. Secure the master cylinder and heel guard to the frame. Tighten the securing screws to **18 Nm**.
3. Connect the push rod to the brake pedal using a new clevis pin and split pin.
4. Incorporating new washers, fit the brake hose to the master cylinder. Ensuring correct orientation of the brake hose, tighten the banjo bolt to **25 Nm**.

> **Warning**
>
> Use only D.O.T. 4 specification brake fluid as listed in the general information section of this manual. The use of brake fluids other than those D.O.T. 4 fluids listed in the general information section may reduce the efficiency of the braking system leading to an accident.
>
> Observe the brake fluid handling warnings given earlier in this section of the manual.

5. Fill and bleed the rear brake system (see page *14-19*).
6. Reconnect the battery, positive (red) lead first.
7. Refit the rider's seat (see page *16-11*).
8. Check for correct brake operation. Rectify as necessary.

> **Warning**
>
> It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you ride the motorcycle again. Failure to take remedial action may result in reduced braking efficiency leading to loss of motorcycle control and an accident.

15 Wheels/Tyres

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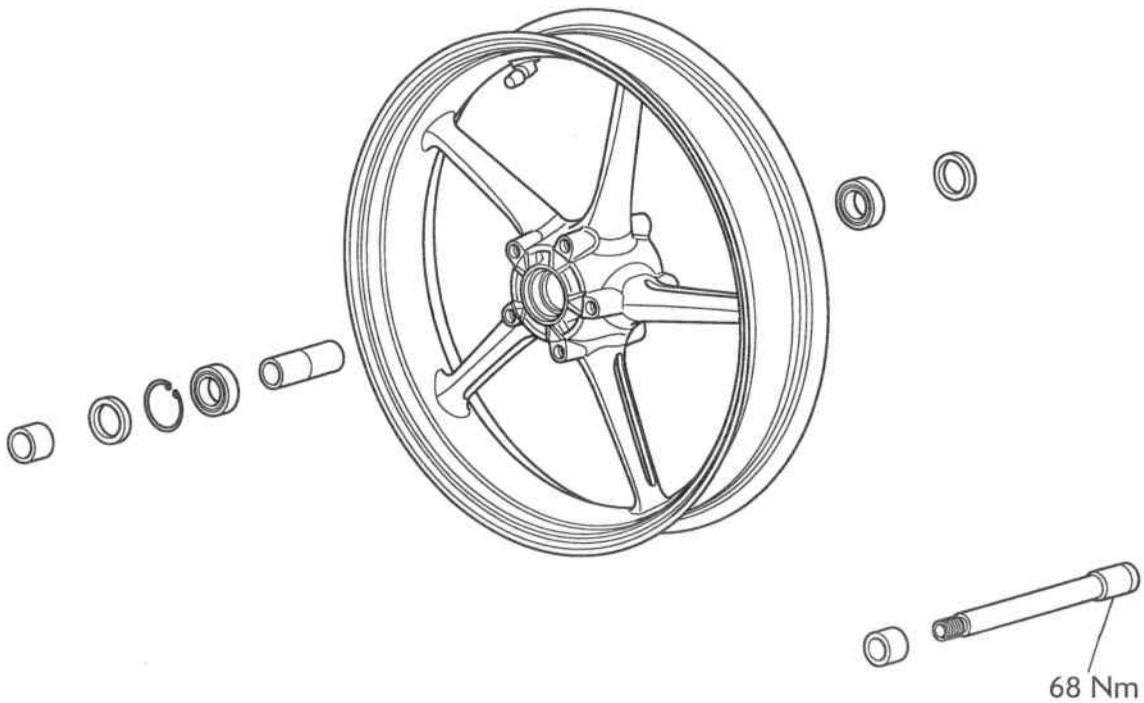
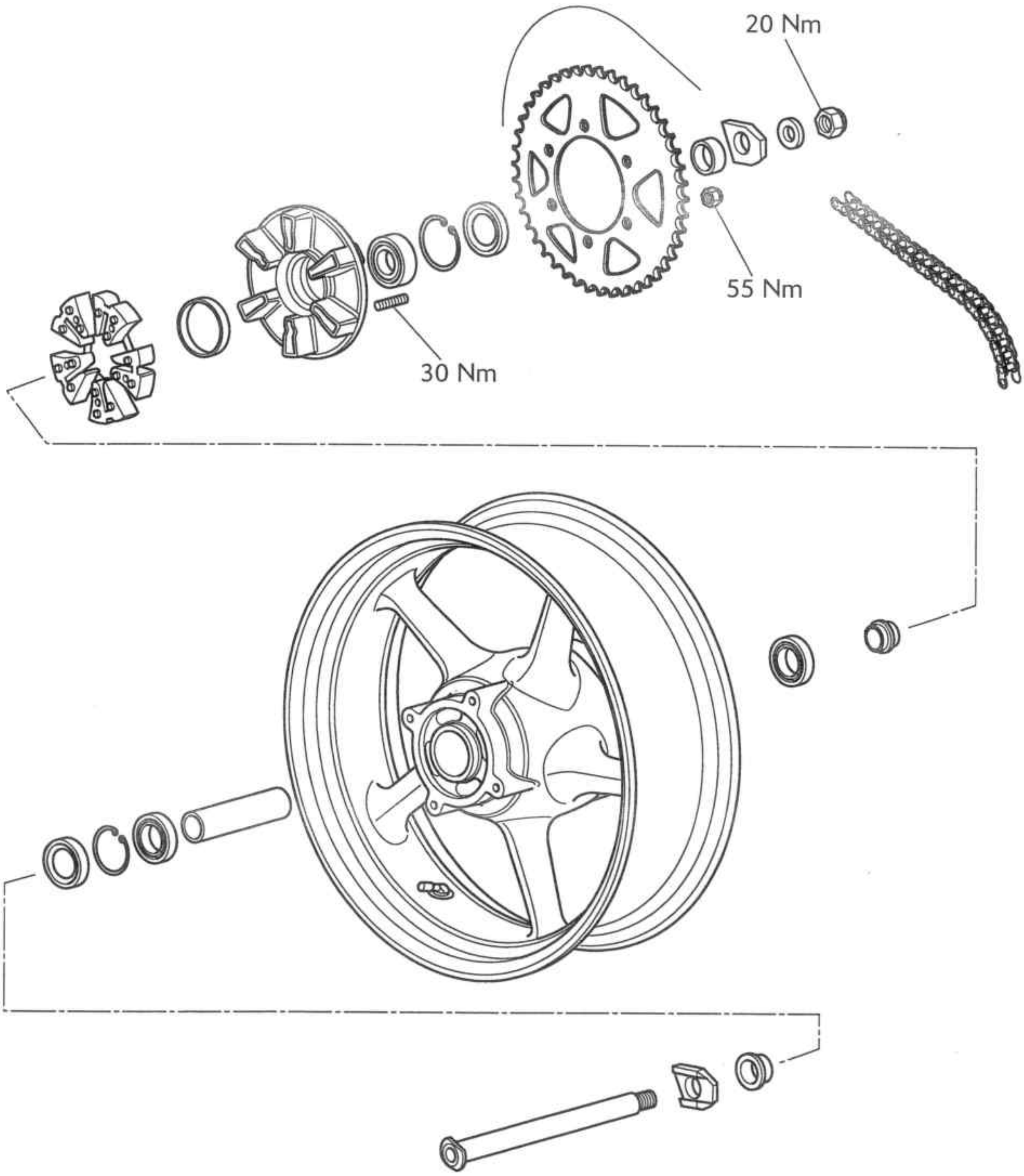
Exploded view - Front Wheel

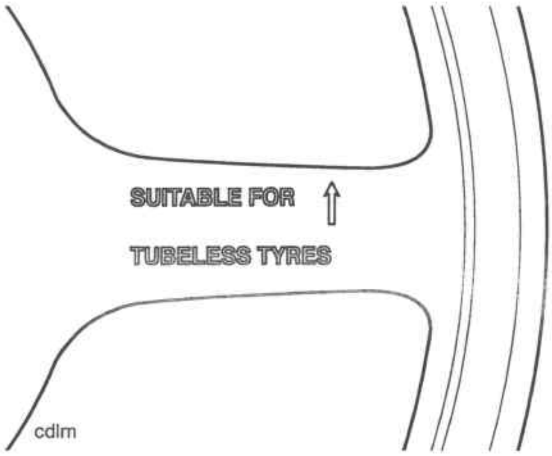


Exploded View – Rear Wheel & Final Drive



Tyres

This model is equipped with tubeless tyres, valves, and wheel rims. Only tyres marked 'TUBELESS' and tubeless type tyre valves mounted on rims marked 'SUITABLE FOR TUBELESS TYRES' can be used.



Typical Wheel Marking

Typical Tyre Marking

Warning

Tyres 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 must be replaced after such use as continued use of a damaged tyre may lead to instability, loss of control and an accident.

Tyre Pressures

Correct inflation pressure will provide maximum stability, rider comfort and tyre life.

Tyre pressures should be checked frequently and adjusted as necessary. Correct tyre pressures are:

Tyre Pressure - Front	2.35 bar (34 psi)
Tyre Pressure - Rear	2.50 bar (36 psi)

Warning

Incorrect tyre inflation will cause abnormal tread wear and instability problems which may lead to loss of control and an accident.

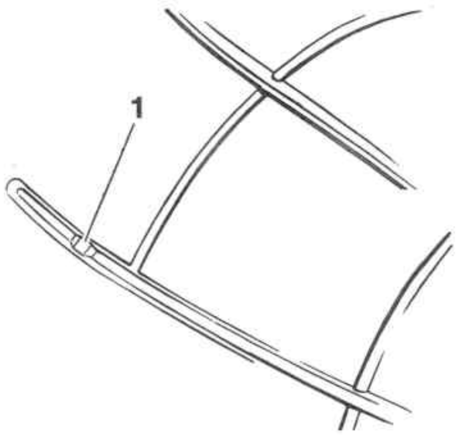
Under-inflation may result in the tyre slipping on, or coming off the rim. Over-inflation will cause instability and accelerated tread wear.

Both conditions are dangerous as they may cause loss of control leading to an accident.

Tyre Wear/Wheel Inspection

As the tyre tread wears down, the tyre becomes more susceptible to puncture and failure. It is estimated that 90% of all tyre failures occur during the last 10% of tread life (90% worn). It is false economy and unsafe to use tyres until they are worn to their minimum.

All tyres are fitted with tread wear indicators. When the tyre becomes worn down as far as the top of a tread wear indicator, the tyre is worn beyond its service life and must be replaced.



1. Tread wear indicator

In accordance with the scheduled maintenance chart, measure the depth of the tread with a depth gauge, and replace any tyre that has worn to, or beyond the minimum allowable tread depth.

Inspect wheels for cracks, splits and kerb damage. Always replace wheels that are suspected of having become damaged.

Warning

Operation with excessively worn tyres is hazardous and will adversely affect traction, stability and handling which may lead to loss of control or an accident.

When tubeless tyres become punctured, leakage is often very slow. Always inspect tyres very closely for punctures.

Check the tyres for cuts, embedded nails or other sharp objects.

Check the rims for dents or deformation. Operation with damaged or defective wheels or tyres is dangerous and loss of control or an accident could result.

Always consult your Triumph dealer for tyre replacement, or for a safety inspection of the tyres.

Minimum Recommended Tread Depth

The following chart can be used as a guide to the minimum safe tread depth.

Under 130 km/h (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.

Important Tyre Information

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.

Warning

If a tyre sustains a puncture, the tyre must be replaced. Failure to replace a punctured tyre, or operation with a repaired tyre can lead to instability, loss of control or an accident.

Never use an inner tube to repair a punctured tyre. The rough surface inside the tyre can chafe the tube leading to instability, rapid deflation, loss of control and 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.

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 adversely affect handling and control leading to loss of control or an accident.

Warning

Do not install tube-type tyres on tubeless rims. The bead will not seat and the tyres could slip on the rims, causing tyre deflation that may result in a loss of vehicle control and an accident.

Do not install an inner tube inside a tubeless tyre. This may cause instability and excessive heat build-up may cause the tube to burst resulting in rapid tyre deflation, loss of vehicle control and an accident.

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

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 a paddock stand.
2. Detach both brake calipers (see page 14-12).

Note:

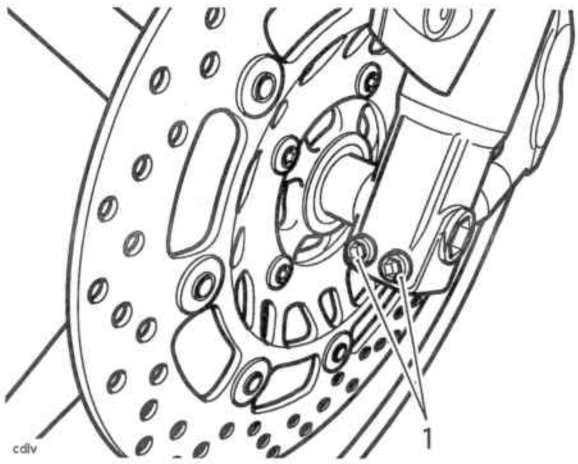
- **It is not necessary to disconnect the brake hoses.**

Warning

Do not allow the calipers to hang on the brake hoses as this may damage the hoses.

Damaged hoses could cause brake failure leading to loss of control and an accident.

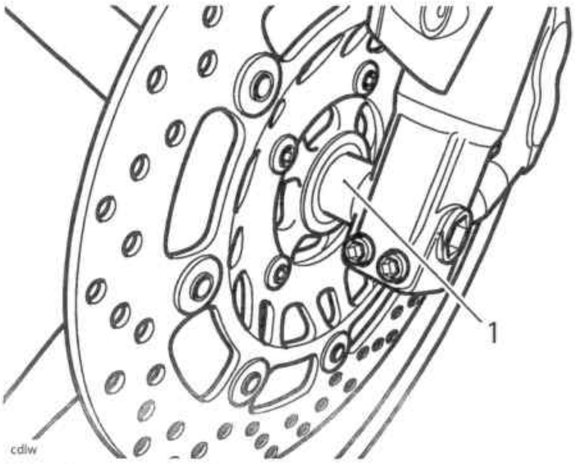
3. Raise and support the front of the motorcycle.
4. Slacken both pinch bolts at the lower end of the left hand fork.



1. Fork pinch bolts

5. Release and remove the wheel spindle, which is threaded into the right hand fork.

6. Remove the wheel and the wheel spacers.



1. Wheel spacers (left hand shown)

7. Place the wheel on wooden blocks.

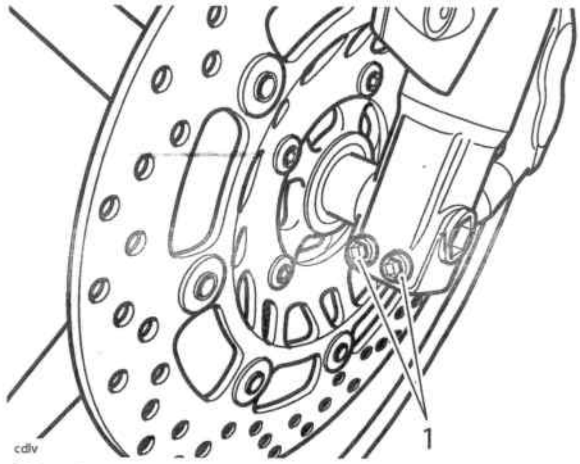
> **⚠ Warning**
>
> Do not allow the wheel to rest on either brake disc as this may damage the disc and could lead to an accident.

> **⚠ Caution**
>
> To prevent wheel and bearing damage, observe absolute cleanliness and ensure there is no dirt ingress to the wheel bearings while the wheel is removed.

8. Thoroughly clean all components and inspect for wear or damage.

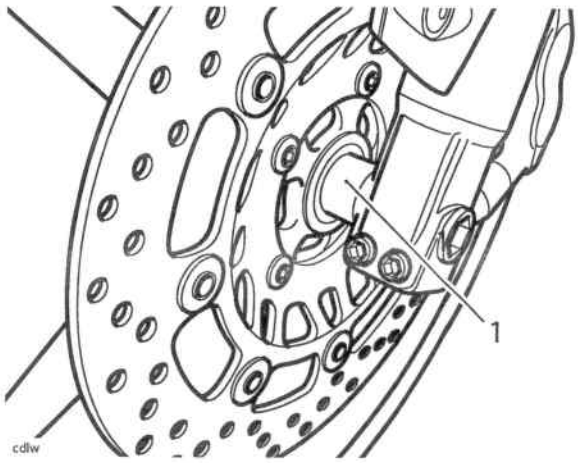
Installation

1. Lightly smear the wheel spacers with grease and locate in the hubs.
2. Position the wheel between the forks ensuring the spacers remain in position on both sides.



1. Wheel spacers

3. Refit the wheel spindle from the left hand side and tighten to **65 Nm**.
4. Lower the motorcycle to the ground and pump the front suspension to allow the left hand fork to 'float' to its natural position on the wheel spindle.
5. Tighten the fork pinch bolts to **20 Nm**.



1. Fork pinch bolts

6. Thoroughly clean and degrease the brake discs.
7. Fit the brake calipers (see page *14-14*).

Rear Wheel

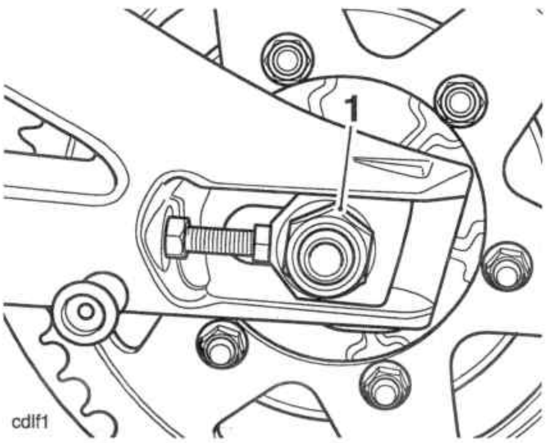
Removal

> **⚠ 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. Raise and support the rear of the motorcycle to allow removal of the rear wheel.

> **⚠ Warning**
>
> If the engine has recently been running, the exhaust system will be hot. Before working on or near the exhaust system, allow sufficient time for the exhaust system to cool as touching any part of a hot exhaust system could cause burn injuries.

2. Remove the nut from the rear wheel spindle.



1. Rear wheel spindle nut

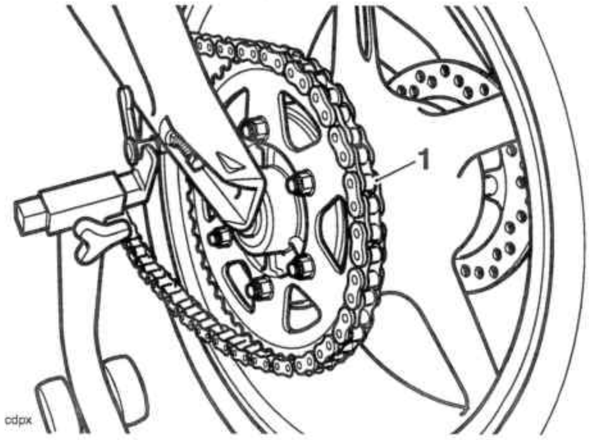
3. Support the wheel and withdraw the wheel spindle.
4. Noting its position, release the brake caliper and carrier from the slot on the swinging arm and roll the wheel forward until the chain can be detached from the rear sprocket.

> **⚠ Warning**
>
> Do not allow the caliper to hang on the brake hose as this may damage the hose.
>
> Damaged hoses could cause brake failure leading to loss of control and an accident.

5. Tie the rear brake caliper aside.
6. Withdraw the wheel and collect the flanged spacer from the right hand side and the plain spacer from the left hand side.
7. Place the wheel on wooden blocks with the drive sprocket uppermost.
8. Remove the final drive. (See page *15-12*).
9. Reposition the wheel on wooden blocks with the rear brake disc uppermost.
10. If required, remove the rear brake disc and discard the disc bolts.

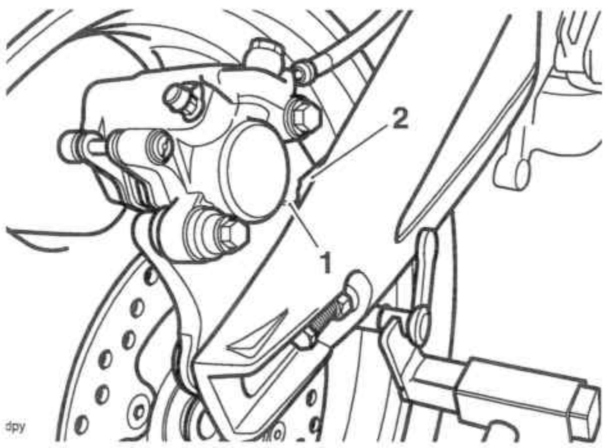
Installation

1. Thoroughly clean and degrease the brake disc.
2. Fit the brake disc and tighten new disc bolts to **22 Nm**.
3. Refit the final drive assembly.
4. Position the wheel within the swinging arm and refit the chain to the final drive sprocket.



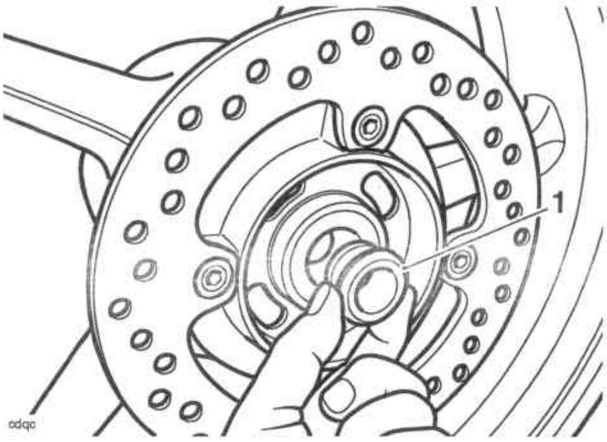
1. Fitting the chain

5. Position the rear brake caliper and carrier to the swinging arm as noted prior to removal. Align the boss on the carrier with the raised slot on the swinging arm.



1. Caliper carrier boss
2. Swinging arm slot

6. Refit the wheel spacers, flanged spacer to the right hand side (flange facing outwards) and plain spacer to the left.



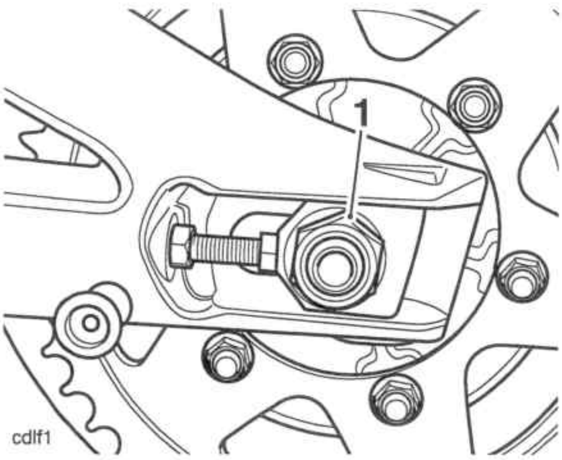
1. Wheel spacer (right hand shown)

7. Lift the rear wheel into position, aligning the wheel, caliper carrier and swinging arm.

Warning

Check that the spacers are still correctly positioned. Incorrectly fitted wheel spacers will cause a dangerous riding condition leading to loss of motorcycle control and an accident.

8. Fit the wheel spindle with the threaded end facing to the left.
9. Keeping the chain adjuster blocks in contact with the adjuster bolts, tighten the wheel spindle nut to **110 Nm**.



1. Rear wheel spindle nut

10. Lower the motorcycle to the ground.

Warning

It is dangerous to operate the motorcycle with defective brakes and you must have your authorised Triumph dealer take remedial action before you attempt to ride the motorcycle again. Failure to take remedial action may reduce braking efficiency leading to loss of motorcycle control and an accident.

11. Check the operation of the rear brake.
12. Check and, if necessary, adjust the chain (see page *12-6*).

Front Wheel Bearings

Removal

1. Remove the front wheel (see page *15-6*).

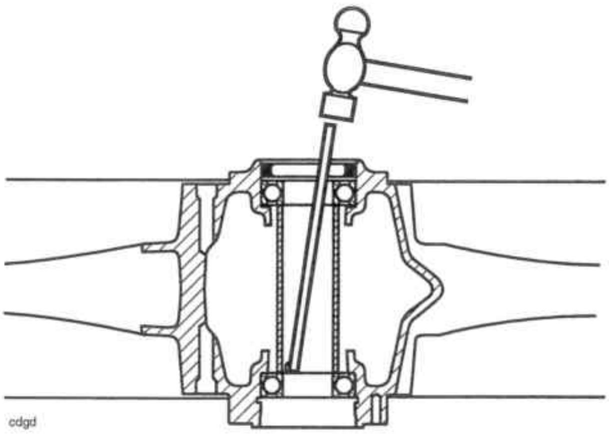
> **⚠ Caution**
>
> Do not allow the wheel to rest on the brake disc, as this may damage the disc. Support the wheel on wooden blocks, equally spaced around the rim, such that the brake disc is raised above the ground.
>
> Lay the wheel on its side while supporting the wheel on wooden blocks to prevent damage to the brake disc.

2. Remove and discard the seals and the bearing circlip.

> **⚠ Warning**
>
> Always wear eye, hand and face protection when using a hammer and drift. Use of a hammer and drift can cause bearings to fragment. Pieces of fragmented bearing could cause eye and soft tissue injuries if suitable protective apparel is not worn.

> **⚠ Caution**
>
> To prevent wheel damage and to aid bearing removal, always apply force evenly on both sides of the bearing to prevent it from 'tipping' and becoming stuck. Application of uneven force will lead to difficulty in removing the bearing and to a damaged wheel.

3. Using a suitable pin punch, through the centre of the wheel, drift out the wheel bearings. Collect the centre sleeve.



Wheel Bearing Removal

Inspection

> **⚠ Warning**
>
> Only remove raised witness marks from within the wheel. Removal of material below any raised areas will reduce the level of interference between the wheel and the bearings. Loss of interference could cause the bearing to become loose in the wheel leading to loss of motorcycle control and an accident.

1. Examine the wheel for any raised witness marks caused by the removal process. Remove any such marks with fine emery paper or a gentle file.

Installation

1. Using a suitable tool, and ensuring the tool seats on the outer race of the bearing only, evenly and progressively drive the new wheel bearings into the wheel hub.
2. Fit a new circlip.
3. Lubricate and fit new seals to the front wheel. Lubricate the seal's knife-edge with grease to NLGI 2 specification (we recommend Mobil HP222).
4. Fit the front wheel (see page *15-7*).

Rear Wheel Bearings

Removal

1. Remove the rear wheel (see page *15-8*).

Caution

Do not allow the wheel to rest on the brake disc, as this may damage the disc. Support the wheel on wooden blocks, equally spaced around the rim, such that the brake disc is raised above the ground.

2. Place the wheel on wooden blocks to prevent damage to the brake disc.
3. Remove and discard the seals and the bearing circlip.

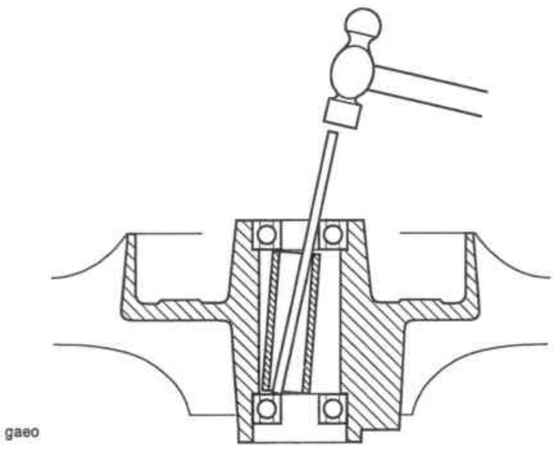
Warning

Always wear eye, hand and face protection when using a hammer and drift. Use of a hammer and drift can cause bearings to fragment. Pieces of fragmented bearing could cause eye and soft tissue injuries if suitable protective apparel is not worn.

Caution

To prevent wheel damage and to aid bearing removal, always apply force evenly on both sides of the bearing to prevent it from 'tipping' and becoming stuck. Application of uneven force will lead to difficulty in removing the bearing and to a damaged wheel.

4. Using a suitable pin punch, through the centre of the wheel, drift out the wheel bearings. Collect the centre sleeve.



Rear Wheel Bearing Removal

Inspection

Warning

Only remove raised witness marks from within the wheel. Removal of material below any raised areas will reduce the level of interference between the wheel and the bearings. Loss of interference could cause the bearing to become loose in the wheel leading to loss of motorcycle control and an accident.

1. Examine the wheel for any raised witness marks caused by the removal process. Remove any such marks with fine emery paper or a gentle file.

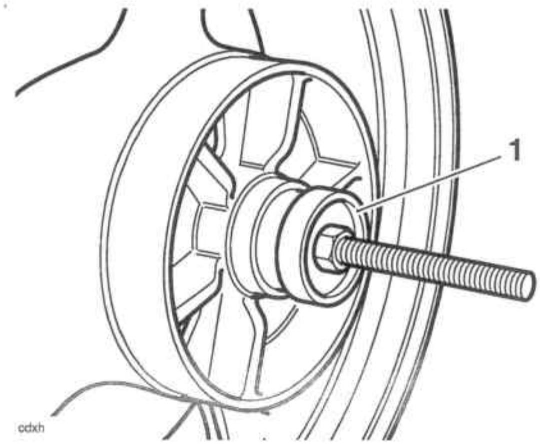
Installation

Note:

- **Refer to the chart below for the correct tool and tool face when inserting bearings. Bearings are inserted by means of a draw-bolt acting on the insertion tool. A support tool is located on the opposite side of the wheel to the insertion tool and as the bolt is tightened, the bearing is drawn into the wheel.**
- **Insert bearings with the marked or shielded side facing outwards and always fit a new bearing circlip and seals.**

	Bearing insertion tool	Support tool
Left bearing	3880070 - T0301 Small face to bearing	3880065 - T0301 Large face to Wheel
Right bearing	3880070 - T0301 Small face to bearing	3880065 - T0301 Large face to wheel

1. Fit the wheel bearings and centre sleeve using the method described on the previous page.



1. Tool T3880070

2. Fit a new circlip.
3. Lubricate and fit new seals to the rear wheel. Lubricate the seal's knife-edge with grease to NLGI 2 specification (we recommend Mobil HP222).
4. Fit the rear wheel (see page *15-8*).

Final Drive

Removal

Warning

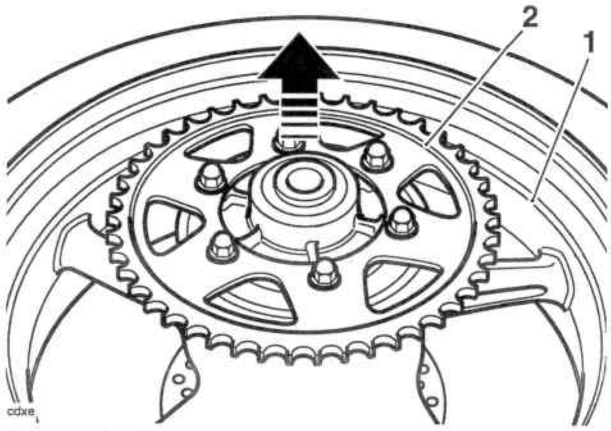
Before starting work, ensure the motorcycle is stabilised and adequately supported. This will help prevent it from falling and causing injury to the operator or damage to the motorcycle.

1. Remove the rear wheel (see page *15-8*).

Caution

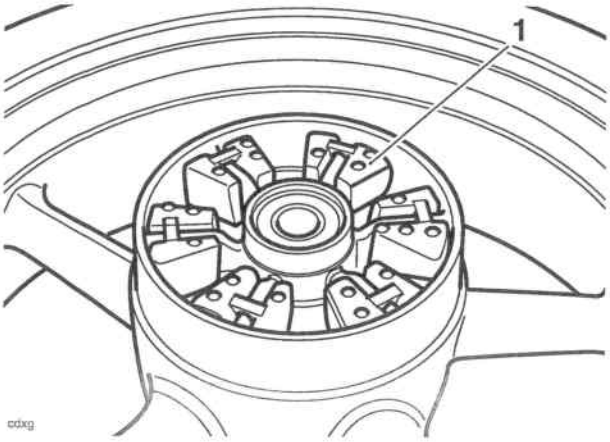
Do not allow the wheel to rest on the brake disc, as this may damage the disc. Support the wheel on wooden blocks, equally spaced around the rim, such that the brake disc is raised above the ground.

2. Place the wheel on wooden blocks with the drive sprocket uppermost.
3. Gently lever the drive flange from the wheel hub.



1. Rear wheel
2. Drive flange

4. Remove the cush drive rubbers.



1. Cush drive

Inspection

1. Check the cush drive rubbers for deterioration, cracks etc.
2. Inspect the sprocket teeth for wear, damage and chips.
3. Check the wheel and drive flange for wear, cracks and damage.

Installation

1. Install the cush drive rubbers to the wheel.
2. Refit the drive flange to the wheel.
3. Refit the rear wheel (see page *15-8*).

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16 Frame and Bodywork

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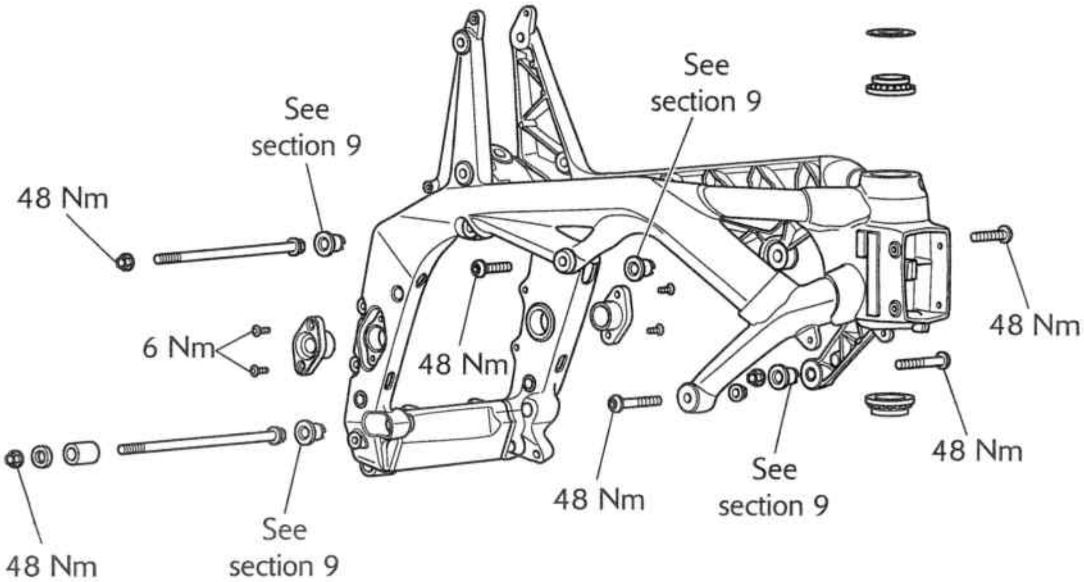
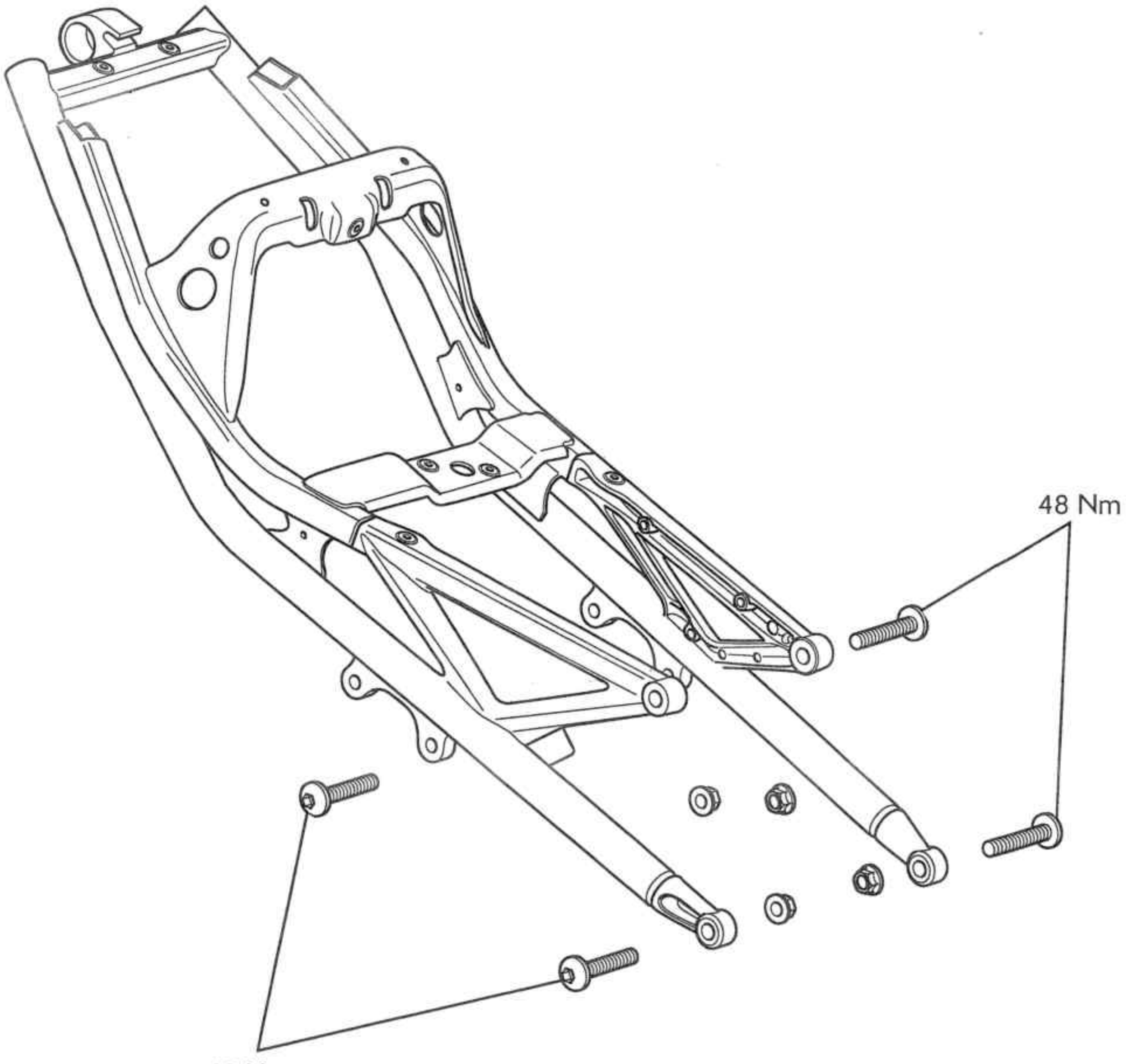
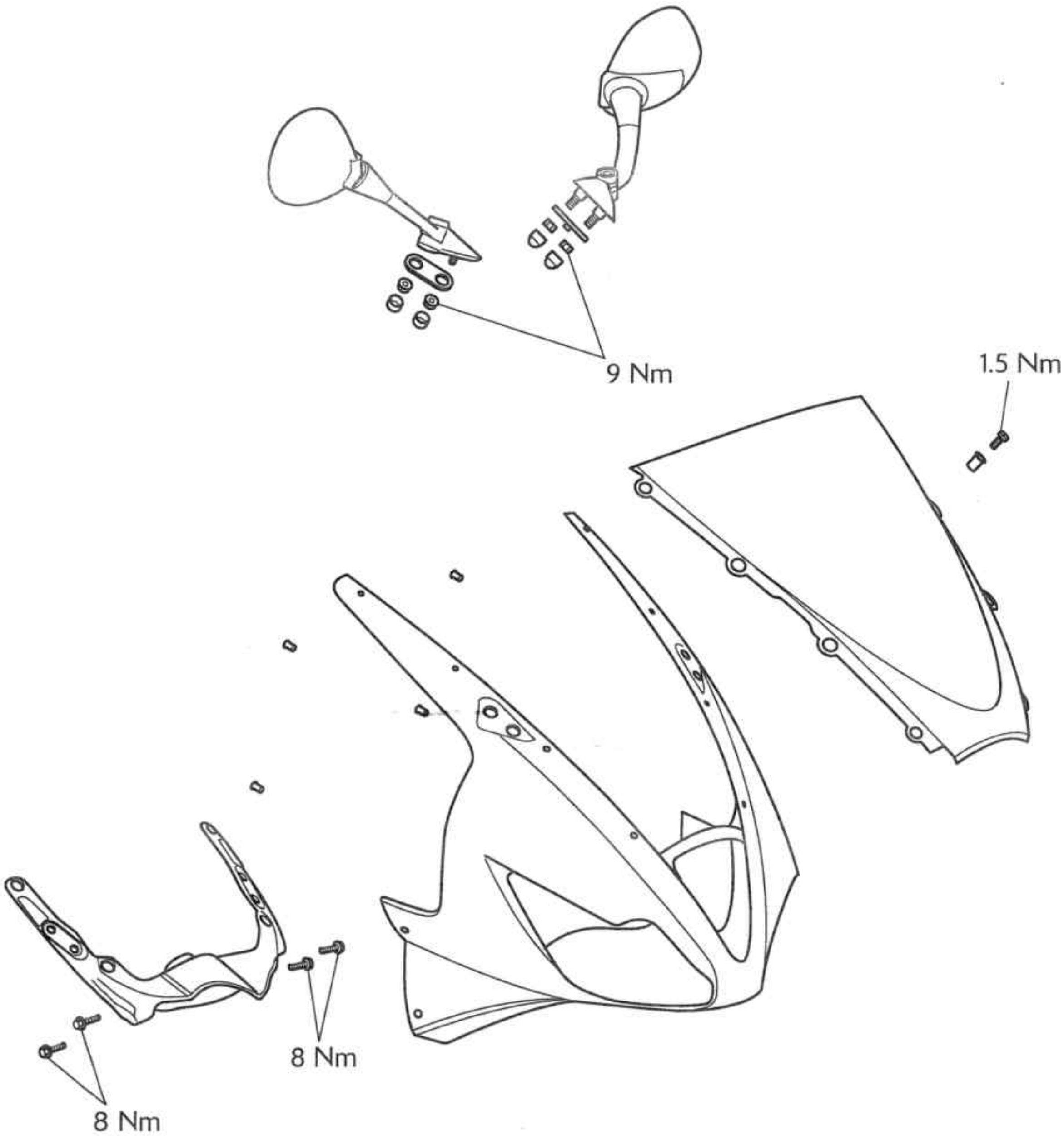
Exploded View - Frame



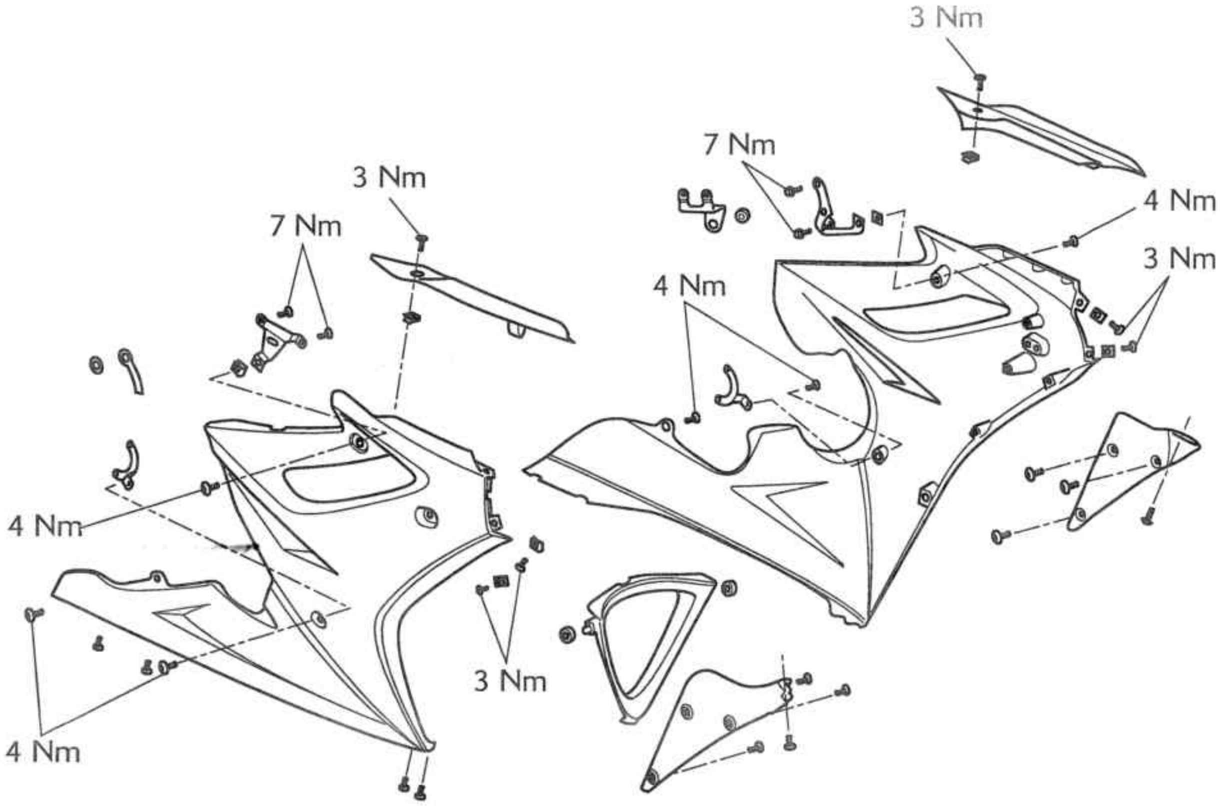
Exploded View - Rear Subframe



Exploded View - Cockpit and Mountings

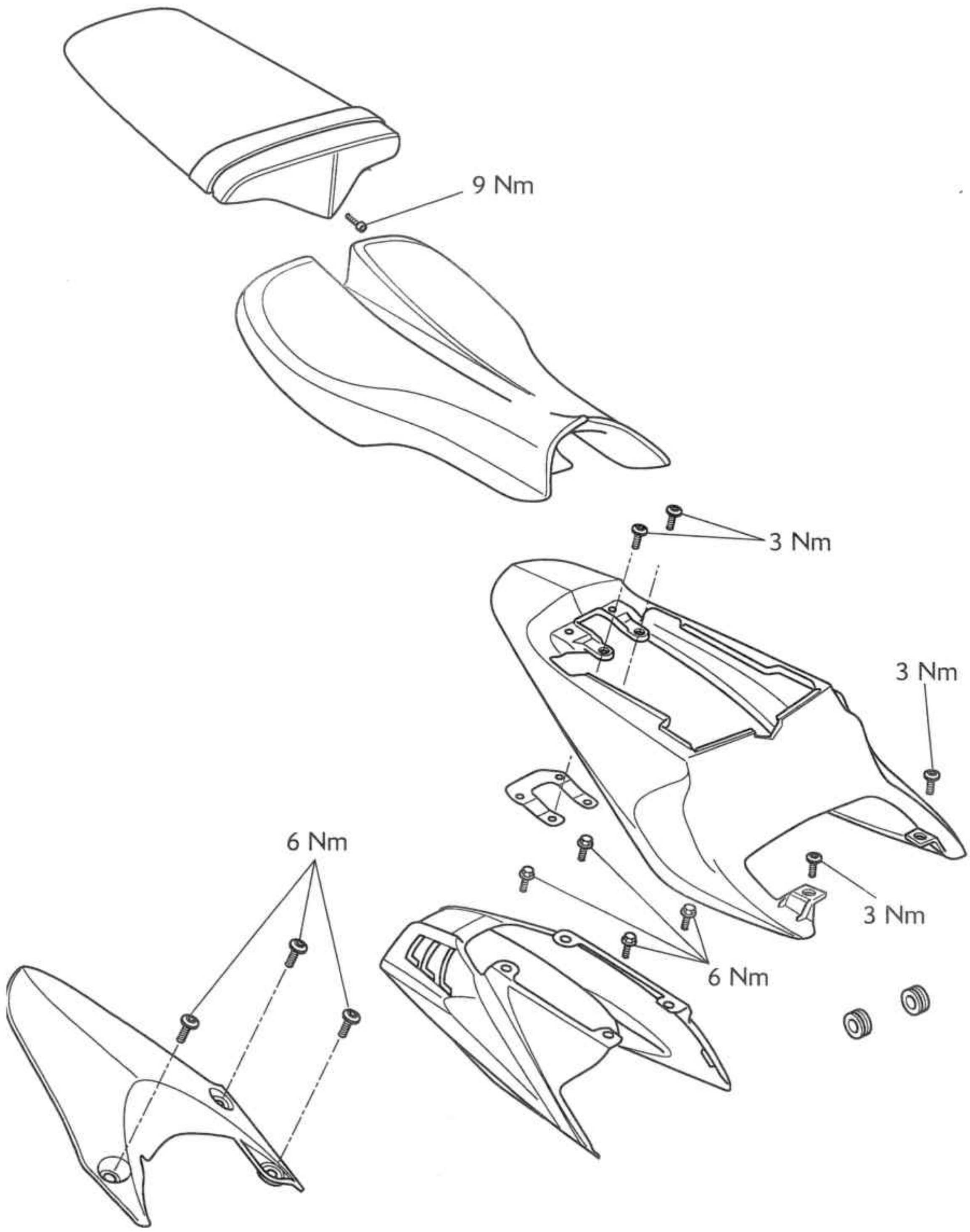


Exploded View - Lower Fairings

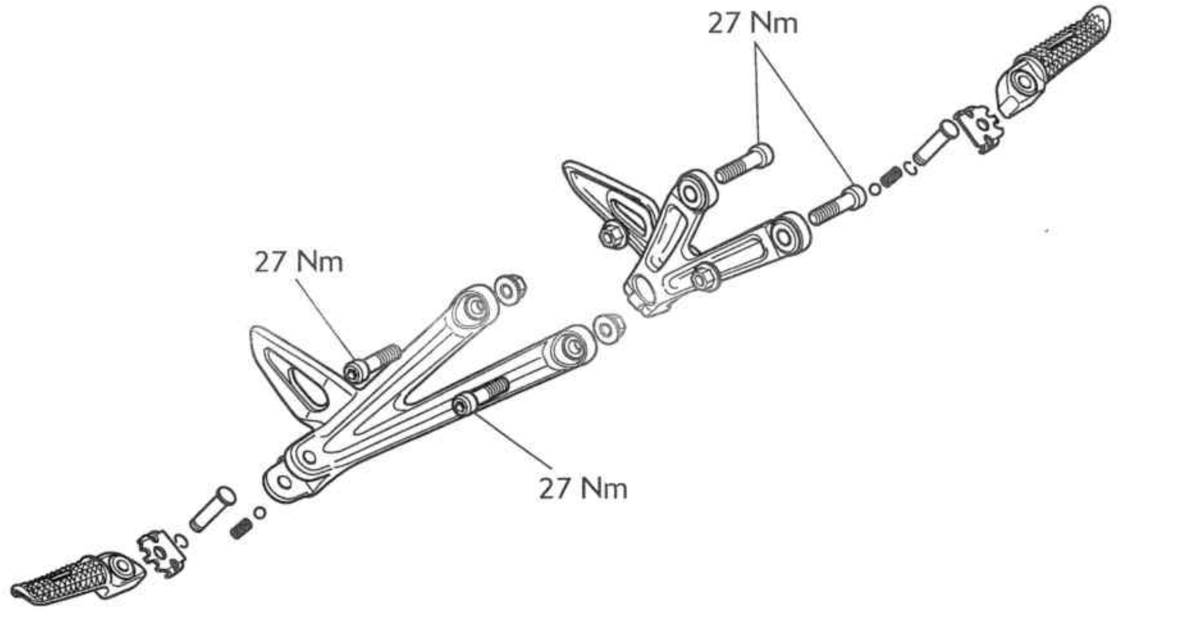


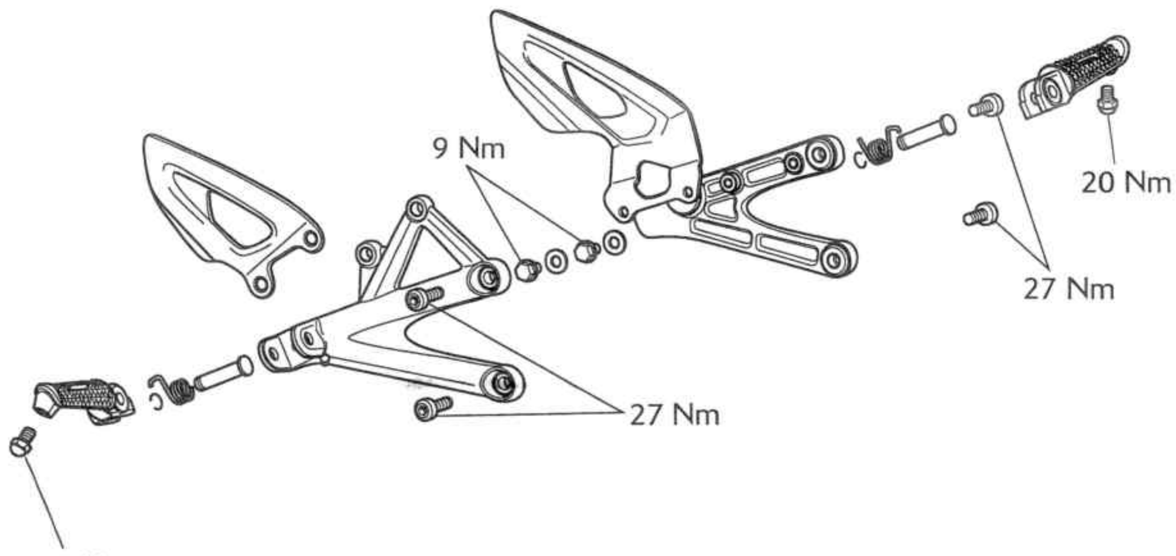
Frame and Bodywork

Exploded View - Rear Panels

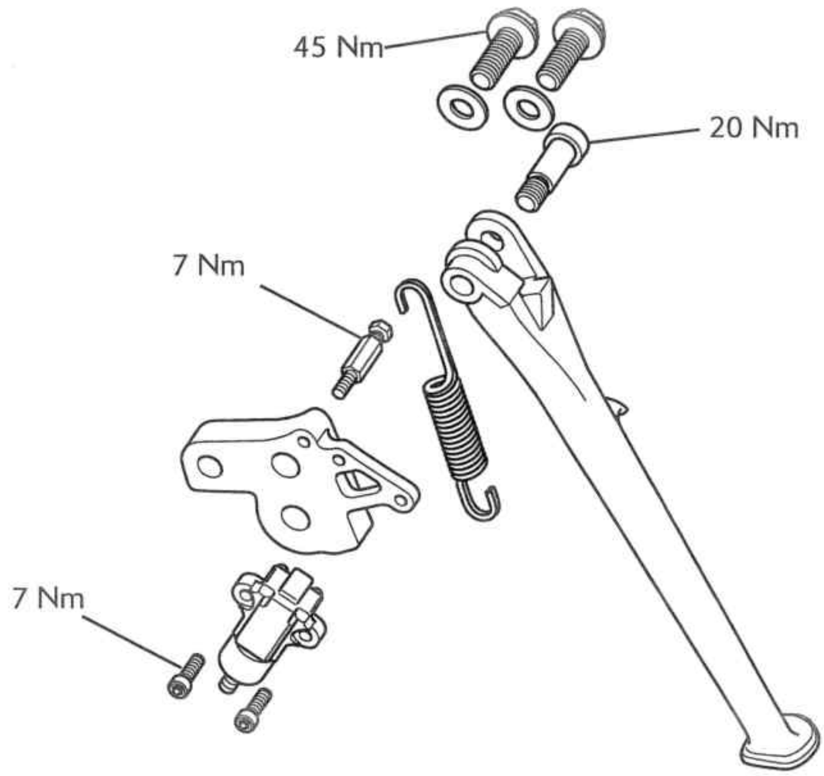


Exploded View - Footrests and Mountings

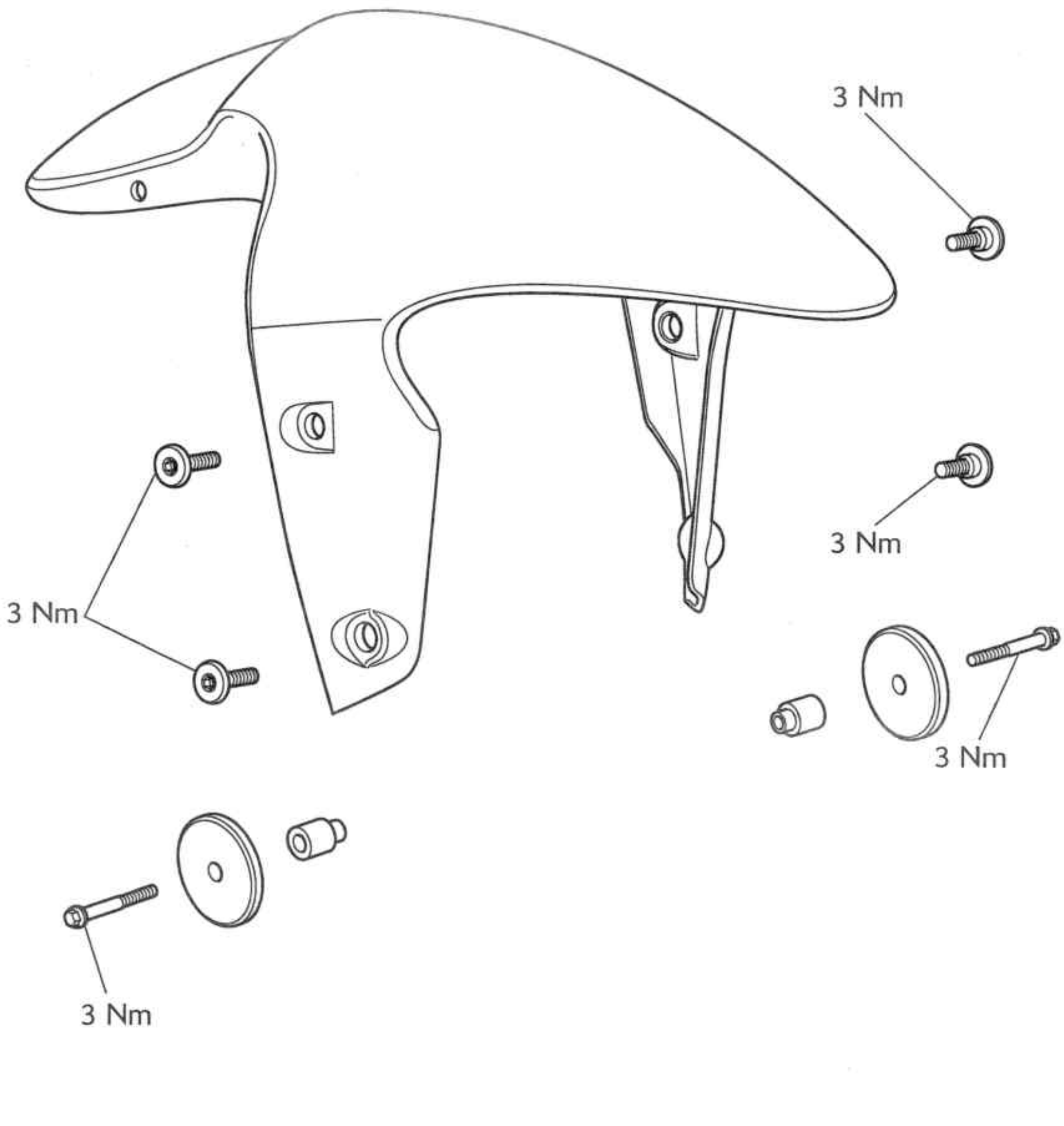




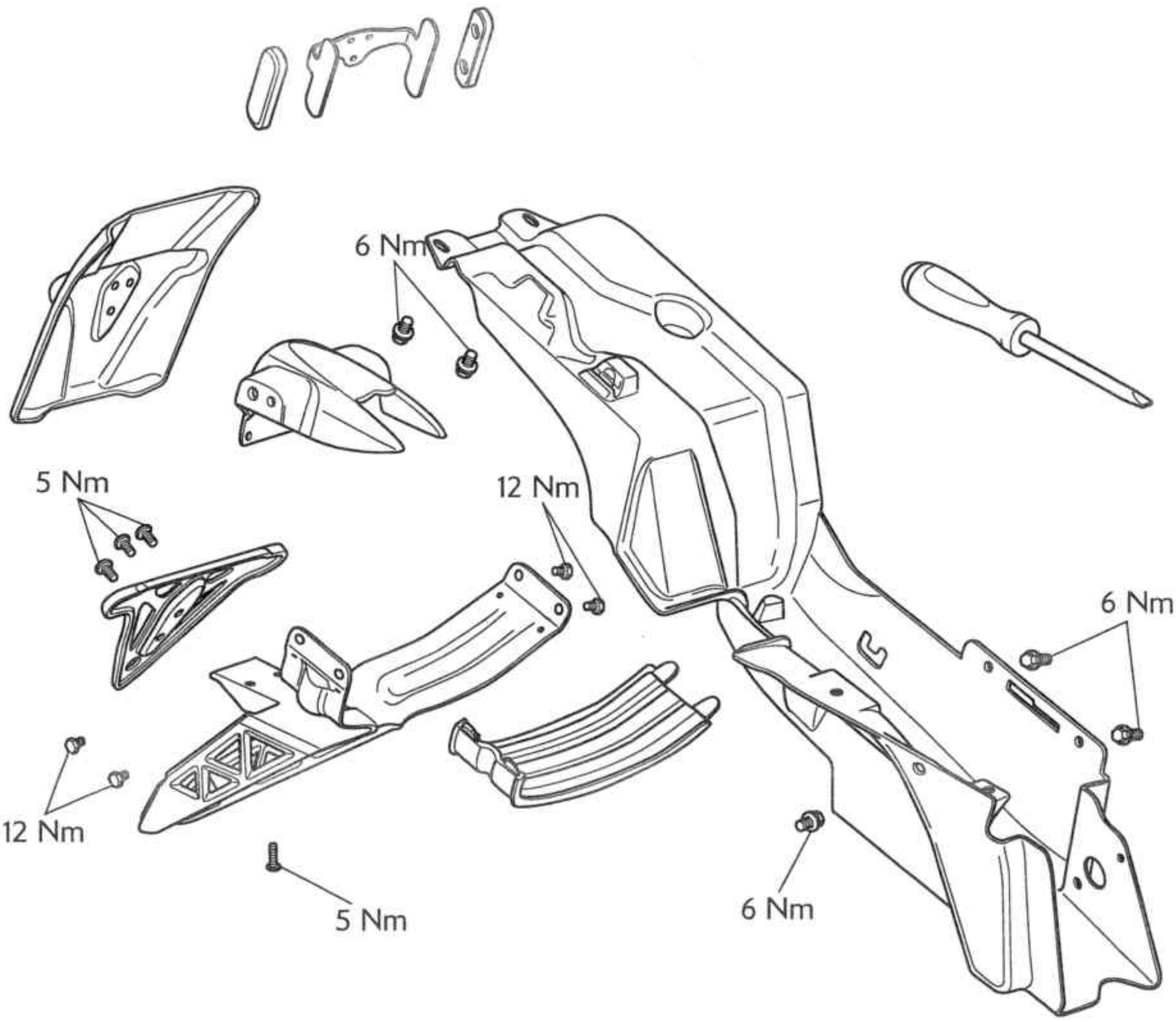
Exploded View - Sidestand



Exploded View - Front Mudguard



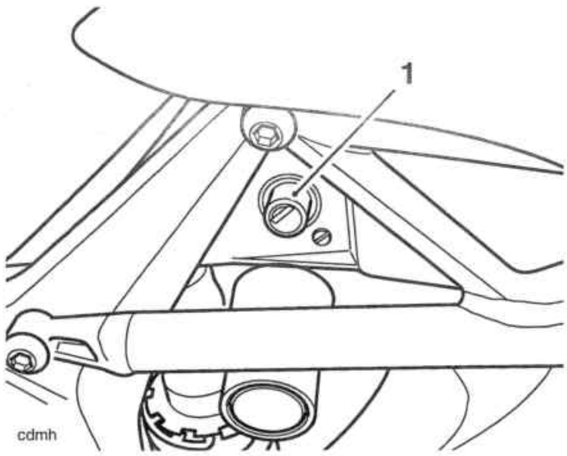
Exploded View - Rear Mudguard



Rider's Seat

Removal

The seat lock is located on the left hand side of the battery tray, in line with the footrest mounting rail. To remove the seat, insert the ignition key into the seat lock and turn it anti-clockwise while pressing down on the rear of the seat. This will release the seat from its lock and allow it to be slid rearwards for complete removal from the motorcycle.



1. Seat lock

Refit

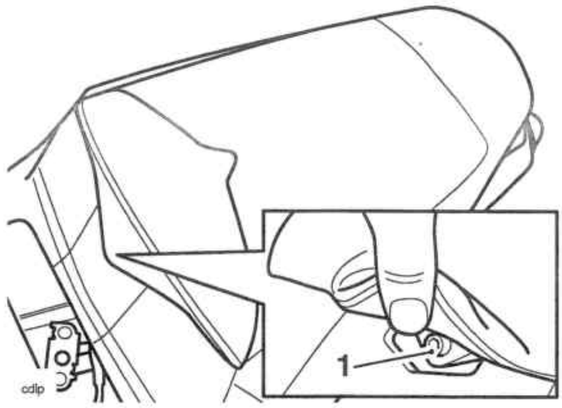
To refit the seat, engage the seat's tongue under the fuel tank and press down at the rear to engage in the seat lock.

> **⚠ Warning**
>
> To prevent detachment of the seat during riding, after fitting always grasp the seat and pull firmly upwards. If the seat is not correctly secured it will detach from the lock. A loose or detached seat could cause loss of motorcycle control and an accident.

Rear Seat

Removal

To remove the rear seat cover or rear seat (where fitted): Remove the fixing located beneath the padding. This will allow the rear seat/seat cover to be slid forwards for complete removal from the motorcycle.



1. Fixing

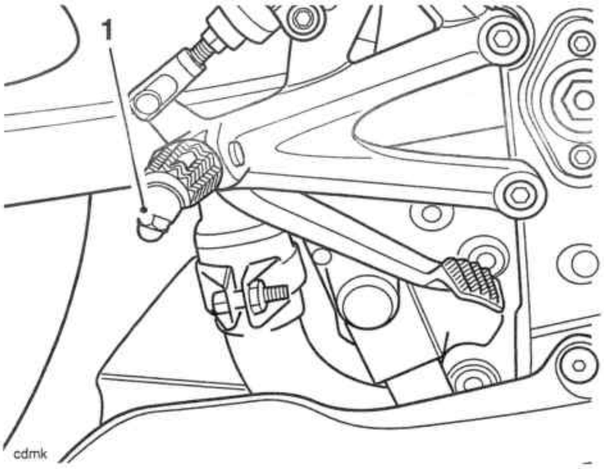
Refit

To refit the rear seat, engage the seat's tag under the rear subframe rail and install the fixing. Tighten the seat fixing to **9 Nm**.

Frame, Footrests and Fixings

Inspection

1. Inspect the frame, footrests and fairings for damage, cracks, chafing and other dangerous conditions. Check fairing and frame fixings for security.
2. Inspect the bank angle indicators on the rider's footrests for wear. The bank angle indicators are worn out when **5mm** of the bank indicator remains.



1. Bank angle indicator

> **Warning**
>
> Use of a motorcycle with bank angle indicators worn beyond the maximum limit will allow the motorcycle to be banked to an unsafe angle.
>
> Banking to an unsafe angle may cause instability, loss of control and an accident causing injury or death.

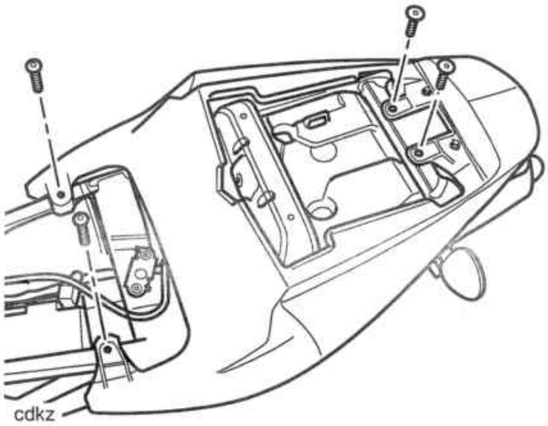
> **Warning**
>
> If the motorcycle is involved in an accident or collision it must be taken to an authorised Triumph dealer for repair or inspection.
>
> Any accident can cause damage to the motorcycle which, if not correctly repaired, may cause another accident which may result in injury or death.

> **Warning**
>
> 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.

Rear Panel

Removal

1. Remove the seats (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. To release the rear panel assembly, remove the fixings shown in the illustration below.



Rear panel fixings

4. Gently pull the panel outwards.
5. Lift and withdraw the rear panel assembly in a rearward direction.
6. Disconnect the rear lamp multi-plug.

Installation

1. Installation is the reverse of removal noting the following:

Note:

- **Tighten the fixings to 3 Nm.**
- **Reconnect the battery, positive (red) lead first.**

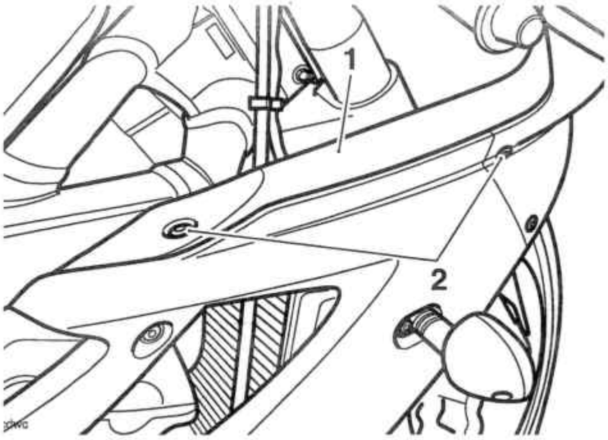
Cockpit Infill Panels

Removal

Note:

- **Follow the same procedure for both left and right hand sides.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the two screws securing the cockpit infill panel.



1. Cockpit infill panel
2. Fixings

4. Remove the panel.

Installation

1. Installation is the reverse of removal noting the following:

Note:

- **Tighten the fixings to 5 Nm.**
- **Reconnect the battery, positive (red) lead first.**

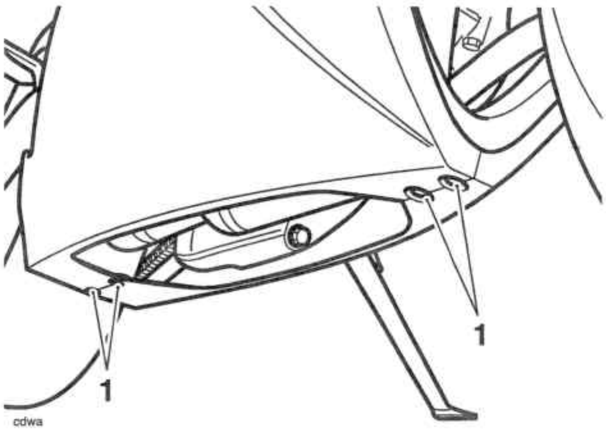
Lower Fairing

Removal

Note:

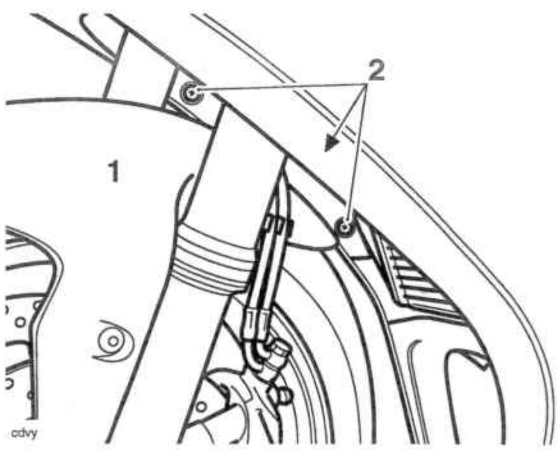
- **Follow the same procedure for both left and right hand sides.**
- **The cockpit does NOT need to be removed in order to remove the lower fairings.**

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit infill panels (see page *16-13*).
4. Remove the four fixings securing the fairing lower halves to each other.



1. Lower fairing fixings

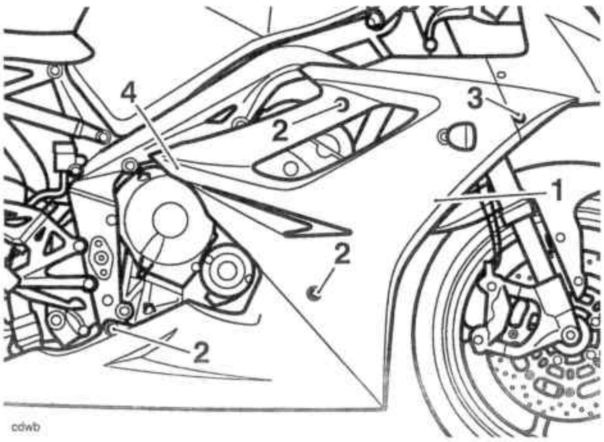
5. Remove the three fixings securing the radiator infill panel to the fairing.



1. Radiator infill panel (right hand shown)
2. Fixings (one fixing is not shown)

6. Remove the three screws securing the fairing to the fairing brackets.
7. Remove the screw securing the fairing to the cockpit.

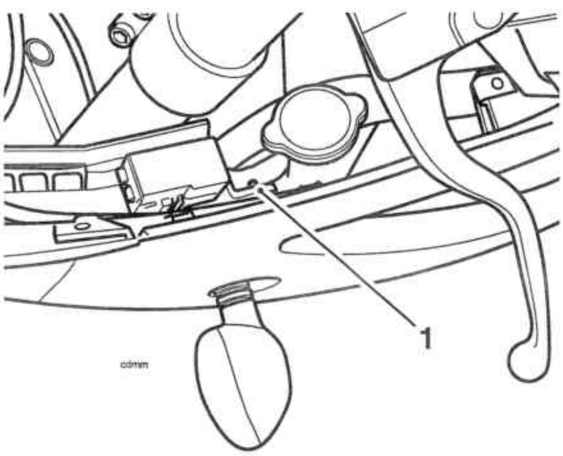
8. Detach the lower fairing stud from the frame grommet.



1. Lower fairing
2. Fairing retaining screws
3. Fairing to cockpit screw
4. Fairing stud/grommet location (one on each fairing)

Note:

- **If the left hand fairing half is being removed, detach the rear fusebox grommet from the fairing stud. The fusebox will remain attached to its forward fixing stud on the headlamp when the lower fairing is removed.**



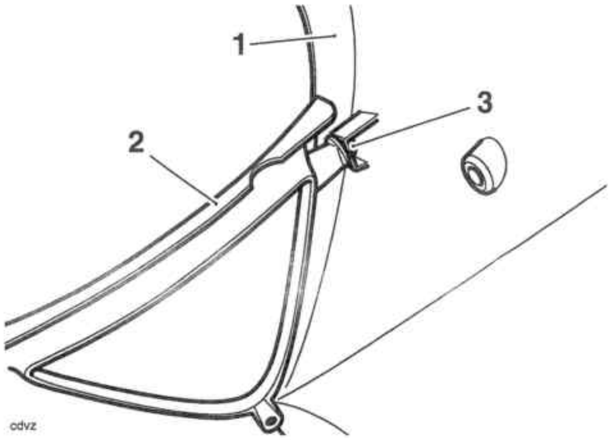
1. Fusebox grommet/stud

9. Ease the panel away from the cockpit to remove it.
10. Disconnect the direction indicator connectors.

Note:

- **When the lower fairing is removed the lower infill panel may remain in either fairing half.**

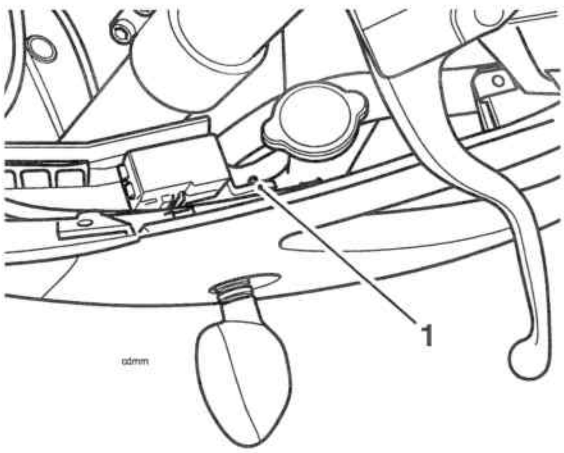
11. Remove the lower fairing infill panel.



1. Right hand lower fairing
2. Infill panel
3. Fixing stud/grommet

Installation

1. Refit the lower fairing infill panel to either fairing half.
2. Position the fairing to the rear of the cockpit.
3. Reconnect the direction indicator connectors.
4. Align the fairing stud to the frame grommet and refit.
5. Align the fairing stud to the fusebox grommet and refit.



1. Fusebox grommet/stud

6. Refit the lower fairing infill panel to the opposite fairing half.
7. Refit the fairing to cockpit lower fixing, and tighten to **3 Nm**.

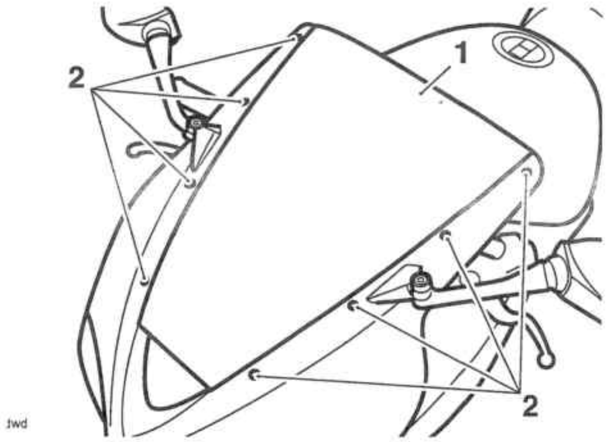
8. Refit the fairing to the fairing brackets, tighten the fixings to **4 Nm**.
9. Refit the radiator infill panel fixings.
10. Refit the lower fairing fixings.
11. Refit the cockpit infill panels (see page *16-13*).
12. Reconnect the battery, positive (red) lead first.
13. Refit the rider's seat (see page *16-11*).

Windscreen

Removal

Note:

- **It is not necessary to remove the mirrors to remove the windscreen.**



1. Windscreen
2. Fixings

1. Release the eight windscreen fixings.
2. Slide the windscreen upwards and to the rear.

Installation

Installation is the reverse of removal noting the following.

Note:

- **Tighten the fixings to 1.5 Nm.**

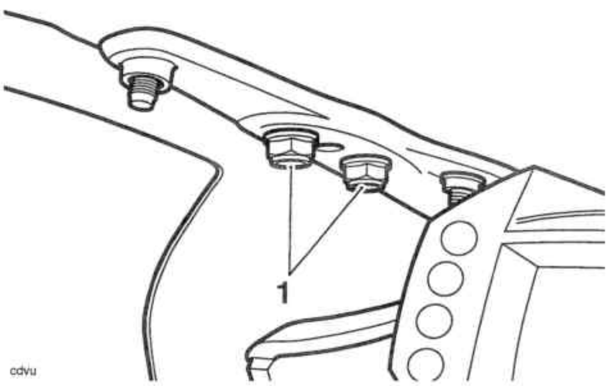
Cockpit

Removal

Note:

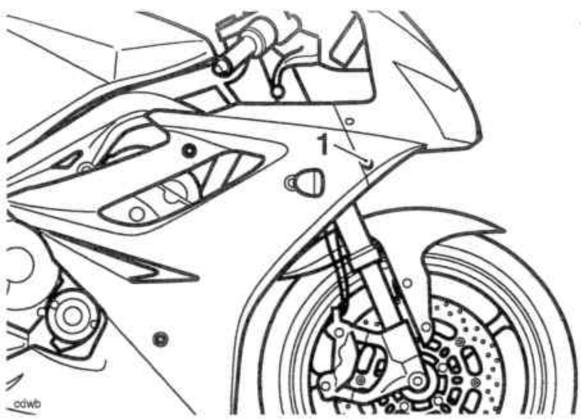
- **The cockpit is removed as an assembly. It is not necessary to remove the lower fairings, instruments or windscreen. The headlight will remain in the cockpit upon removal.**

1. Remove the rider's seat (see page *16-11*)
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit infill panels (see page *16-13*).
4. Remove the caps on the mirror securing nuts and release the two nuts holding each mirror.
5. Remove both mirrors.



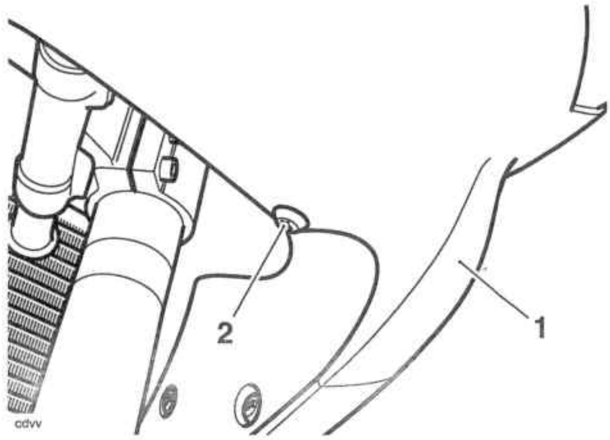
1. Mirror fixings

6. Remove the two screws (one on each side) securing the cockpit to each lower fairing.



1. Fairing to cockpit screw

7. Remove the two fixings (one on each side) securing the radiator infill panel to the cockpit.



1. Cockpit
2. Radiator infill panel fixing (left hand shown)

8. With the aid of an assistant detach the cockpit and disconnect the headlight multi-plug.

Note:

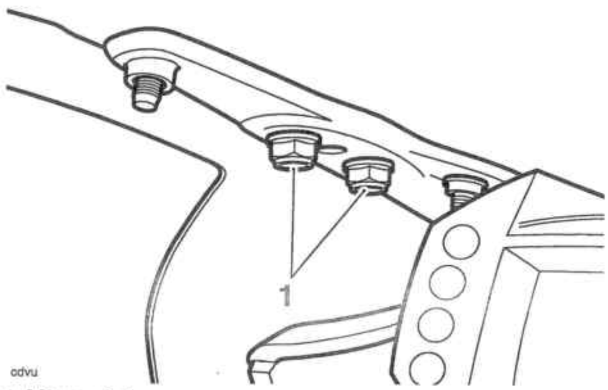
- **Before removing the cockpit from the motorcycle, note the exact routing of the cockpit harness.**

9. Detach the cockpit wiring harness from the cockpit.
10. Remove the cockpit in a forward direction.

Installation

1. With the aid of an assistant position the cockpit to the motorcycle.
2. Refit the cockpit harness following the routing noted during removal.
3. Reconnect the headlight multi-plug.
4. Refit the cockpit to the lower fairings, tighten the two fixings to **3 Nm**.
5. Refit the two fixings (one on each side) securing the radiator infill panel to the cockpit.

6. Refit the mirrors, tighten the fixings to **9 Nm**. Refit the nut covers.



1. Mirror fixings

7. Refit the cockpit infill panels (see page *16-13*).
8. Connect the battery, positive (red) lead first.
9. Refit the rider's seat (see page *16-11*).

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17 Electrical

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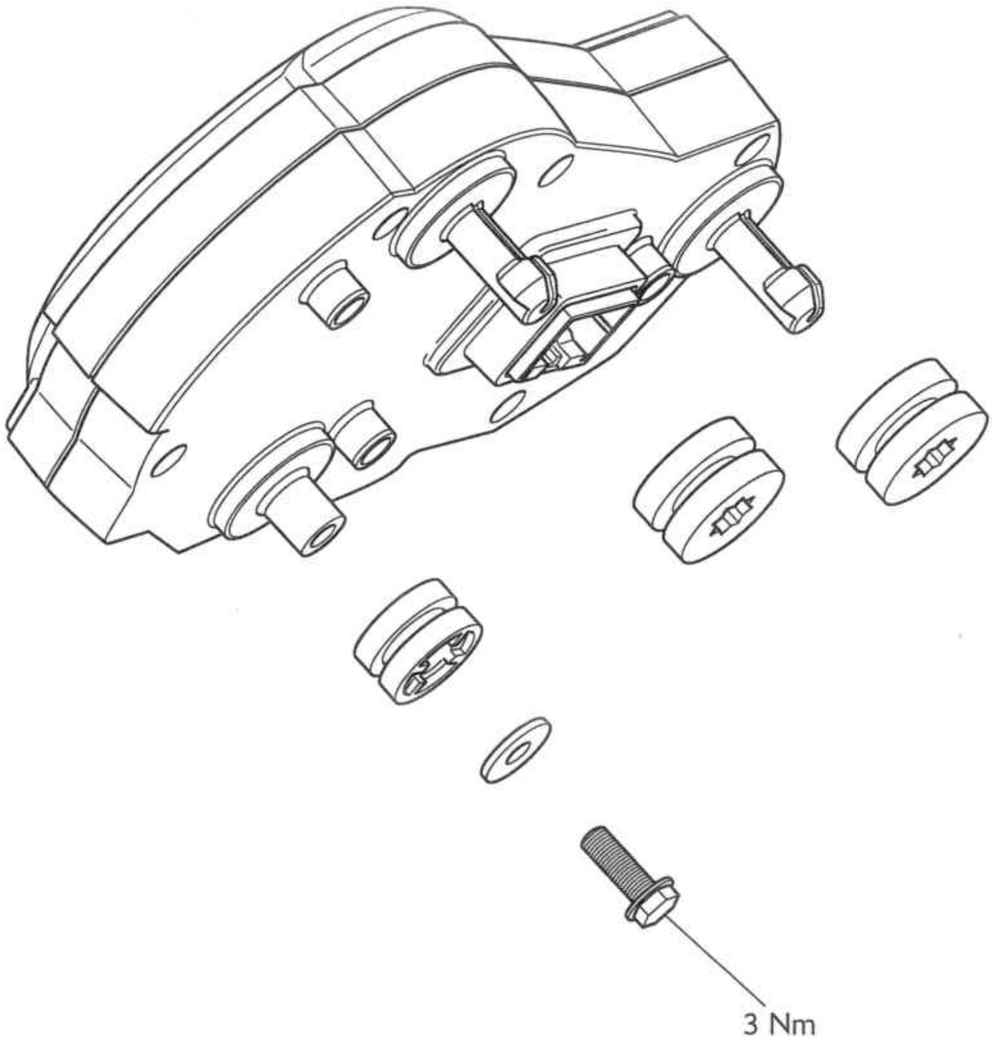
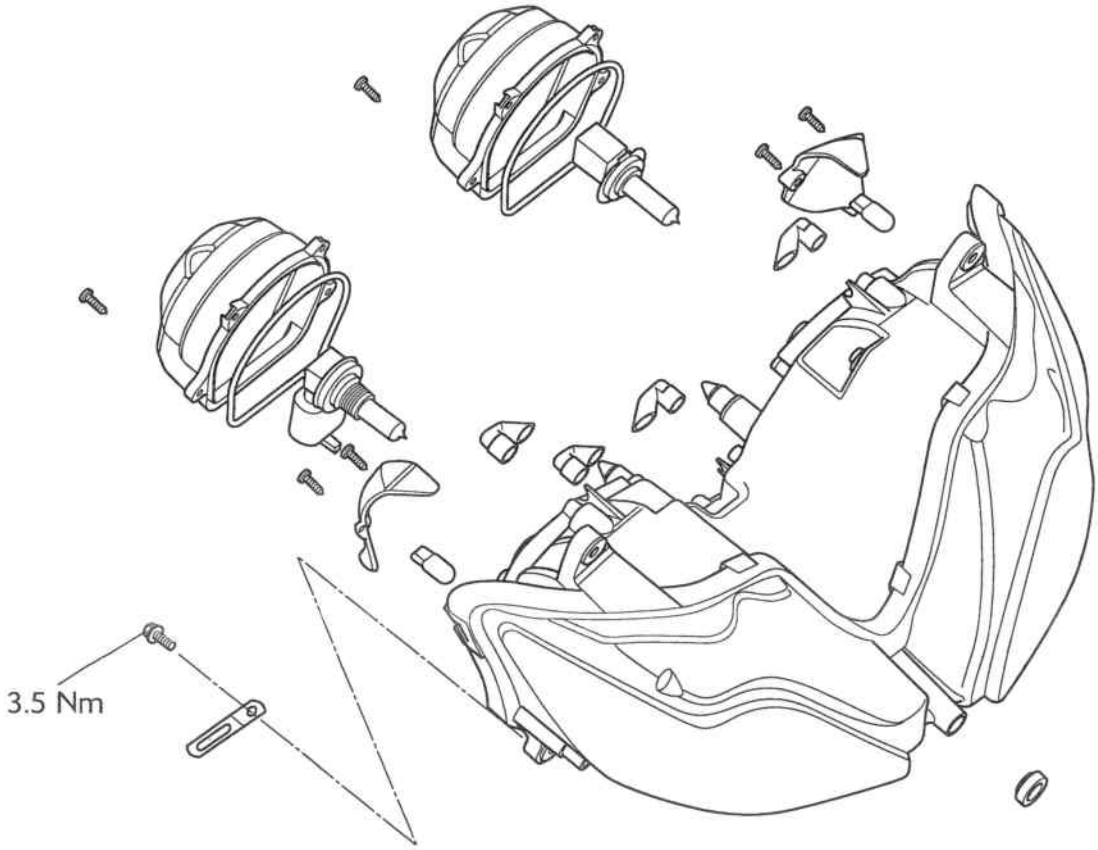
Electrical

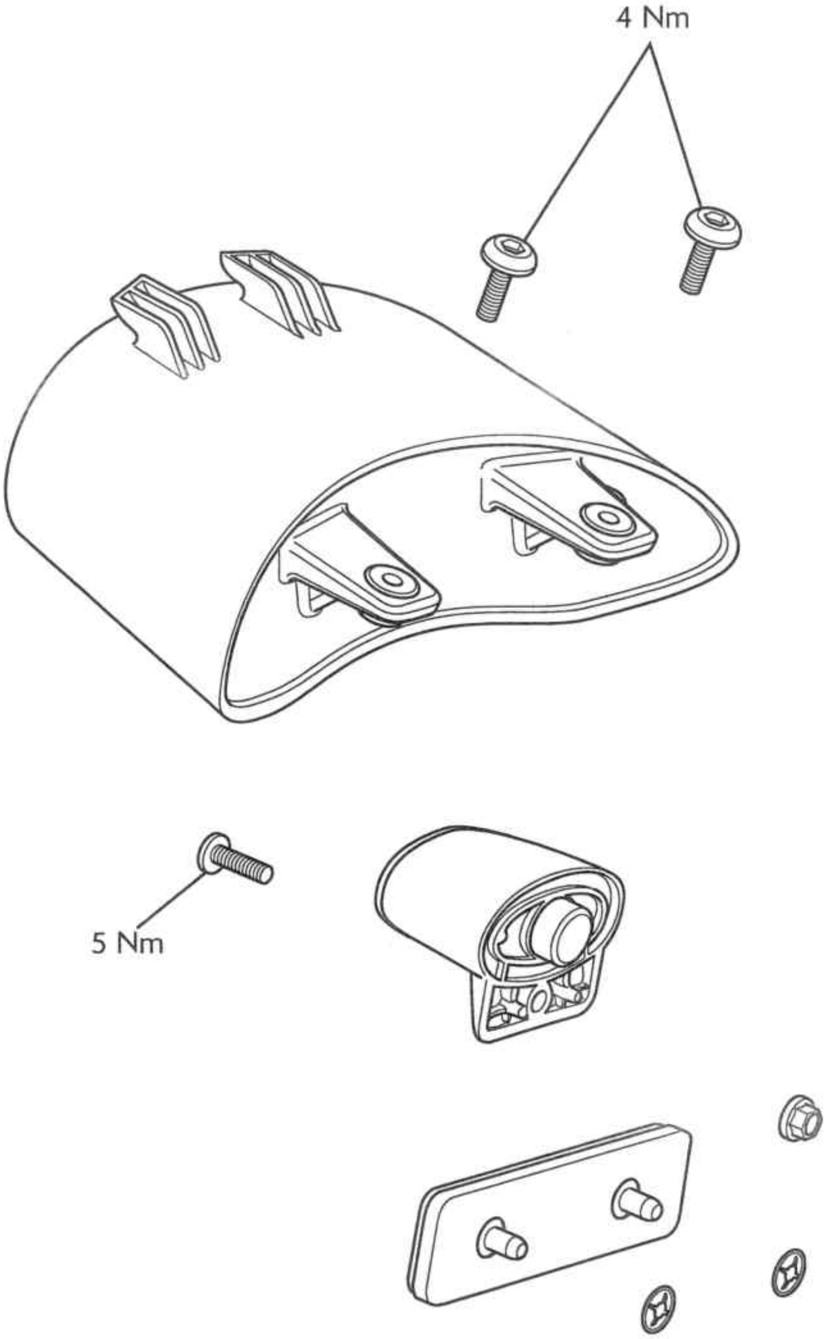
Exploded View - Instruments



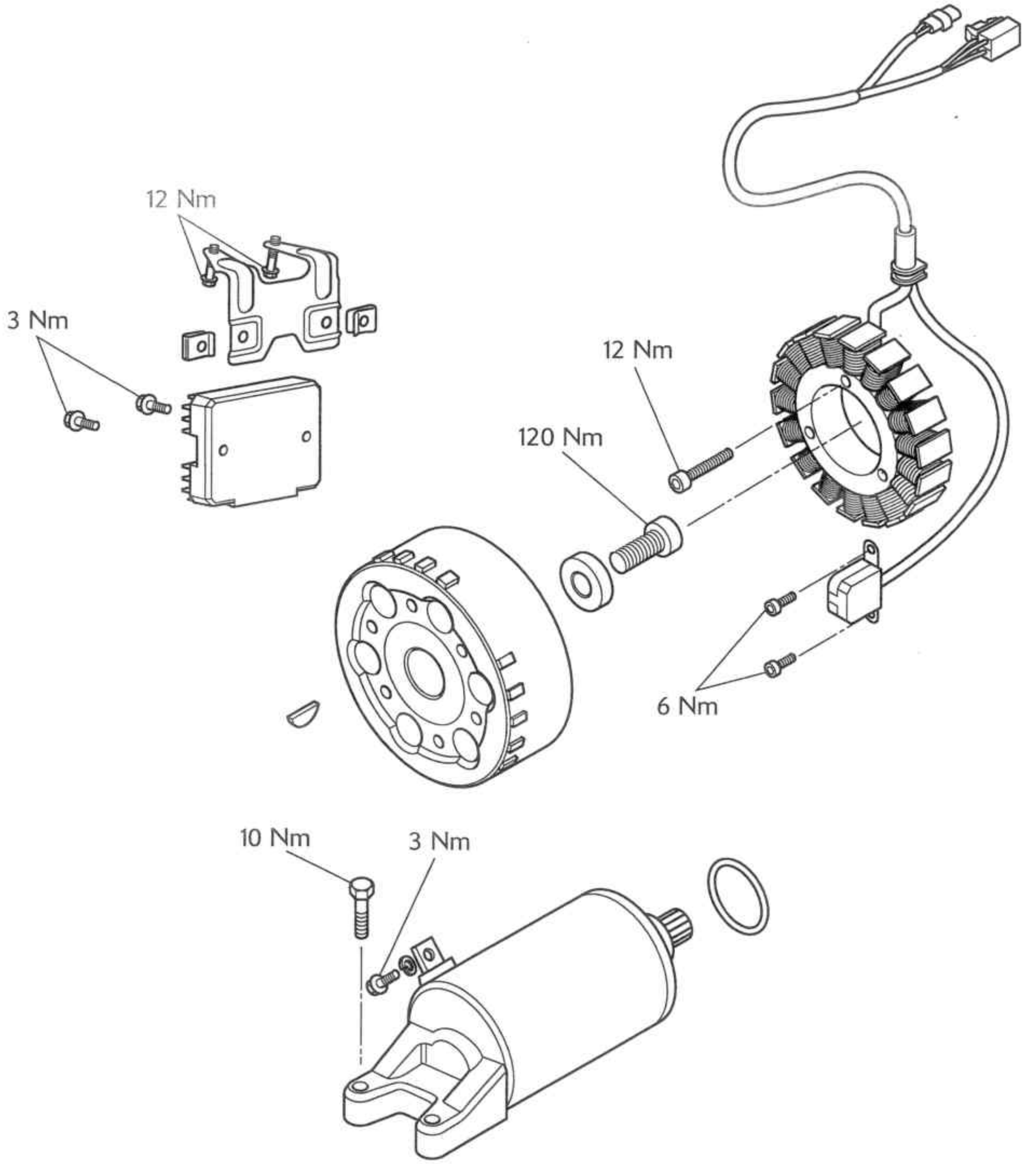
Exploded View - Headlight



Exploded View - Rear Light



Exploded View - Alternator and Starter



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.

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.

Warning

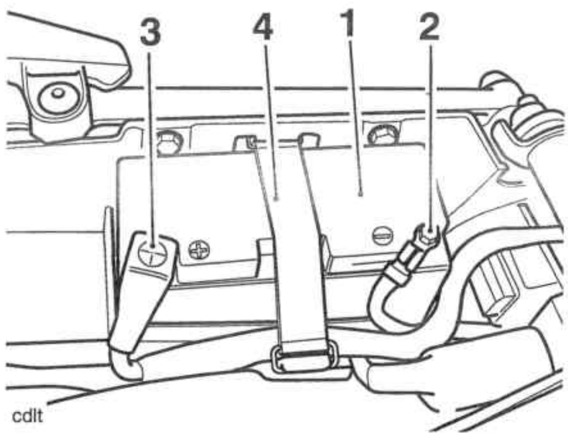
The battery electrolyte is corrosive and poisonous. Never swallow battery electrolyte or allow electrolyte to come into contact with the skin. Always wear eye and skin protection when adjusting the electrolyte level.

Battery Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the battery strap.
4. Take the battery out of the case.

Warning

Ensure that the battery terminals do not touch the motorcycle frame as this may cause a short circuit or spark which would ignite battery gases causing a risk of personal injury.



1. Battery
2. Negative (-) terminal
3. Positive (+) terminal
4. Battery strap

Battery Refit

Warning

Ensure that the battery terminals do not touch the motorcycle frame as this may cause a short circuit or spark which would ignite battery gases causing a risk of personal injury.

1. Place the battery in the battery case.
2. Reconnect the battery, positive (red) lead first.
3. Apply a light coat of grease to the terminals to prevent corrosion.
4. Cover the terminals with the protective caps.
5. Refit the battery strap.
6. Refit the rider's seat (see page *16-11*).

Battery Commissioning and Charging

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 electrolyte solution is SULPHURIC ACID. Ensure that you read all the warnings supplied with the battery and are familiar with the necessary safety precautions and remedial actions should a spillage or contamination occur.

1. Read the instructions and warnings delivered with the battery.
2. Place the battery on a flat level surface and remove the sealing foil.
3. Remove the battery sealing strip from the electrolyte container (if applicable) and save for later in this procedure. Do not break the seal on the electrolyte container.
4. Place the electrolyte container and adapter (if applicable) on the battery and fill the battery according to the manufacturers instructions.
5. After starting to fill the battery with electrolyte, allow the battery to stand for 30 minutes with the filling container in place.
6. Check that all of the electrolyte has drained from the container. Do not remove the container at this point. If the container has not completely drained, tap the sides of the container to start the electrolyte flowing again.
7. After the 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.
8. Remove the electrolyte container and adapter carefully, and dispose of immediately.
9. Place the sealing cap strip LOOSELY over the filling holes of the battery.
10. Charge the battery using the BatteryMate 150-9. Refer to the instructions supplied with the BatteryMate 150-9.
11. After charging is complete, press down firmly with both hands to seat the caps (do not use tools or force the caps into position).
12. Disconnect the charger and allow the battery to stand for 1 hour before fitting to the motorcycle.
13. 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 routine recharging such as during storage.

It is not possible to adjust the electrolyte level in the battery.

Battery Already in Service

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.**

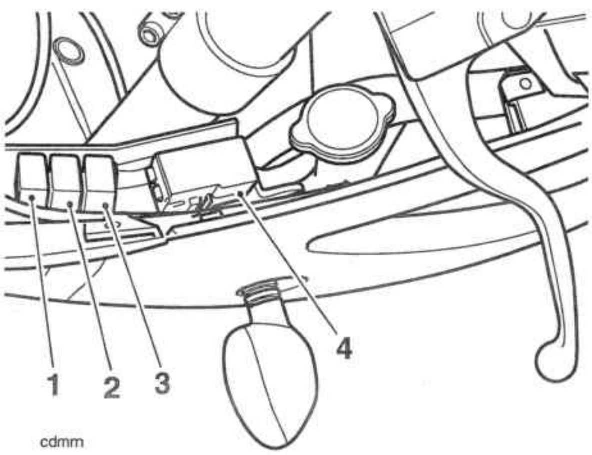
Table of Battery Charging Times

State of charge	Voltage	Action	Charge time (using BatteryMate 150-9)
100%	12.8V - 13.0V	None. Check at 6 months from date of manufacture	None required
75% - 100%	12.5V - 12.8V	May need slight charge. If no charge given, check in 3 - 4 months	3 - 6 hours
50% - 75%	12.0V - 12.5V	Needs charge	5 - 11 hours
25% - 50% V	11.5V - 12.0V	Needs charge	at least 13 hours
0% - 25%	11.5V or less	Needs recovery using BatteryMate 150-9. Re-test after recovery	20 hours

Relays

The relay pack is located beneath the left hand fairing infill panel, adjacent to the fuse box. To gain access to the relays, remove the left hand infill panel (see page 16-13).

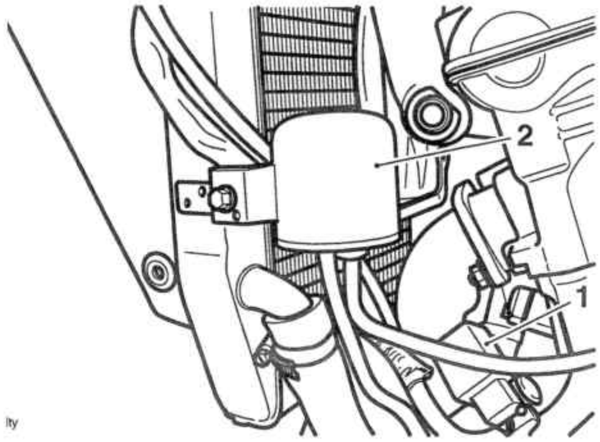
Relay identification



1. Cooling fan relay
2. Engine management system (EMS) main relay
3. Starter relay
4. Fuse box

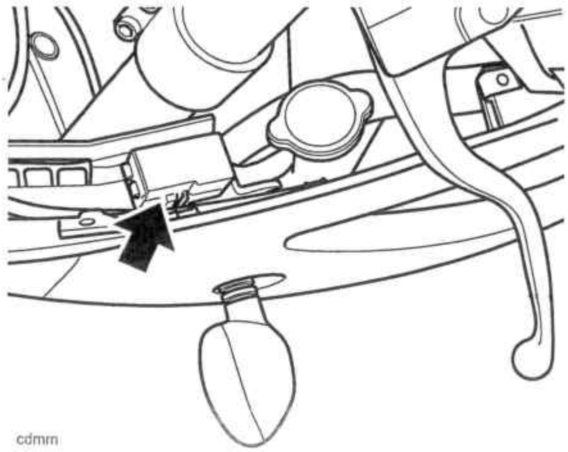
Direction Indicator Unit

The direction indicator unit is located behind the left hand lower fairing, adjacent to the vacuum reservoir for the intake air flap.



1. Direction indicator unit
2. Vacuum reservoir

Fuses



Arrowed: Fuse Box

Fuses are arranged in the fuse box located beneath the left hand fairing infill panel.

If a fuse fails during operation, inspect the electrical system to determine the cause, and then replace it with a new fuse of the 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. Although no spare 5 Amp. fuse is supplied in the fuse box, it is strongly recommended that a spare 5 Amp. fuse be carried.

Fuse Identification

A blown fuse is indicated when all of the systems protected by that fuse become inoperative. When checking for a blown fuse, use the table below to establish which fuse has blown.

Fuse No.	Circuits Protected	Fuse Rating
1	Dip and main beam headlights, starter relay	15
2	Ignition switch, starter circuit	10
3	Auxiliary lighting	5
4	Horn, indicators, alarm	10
5	Cooling fan	15
6	Engine management system	20

The fuse identification numbers listed correspond with those printed on the fuse box cover.

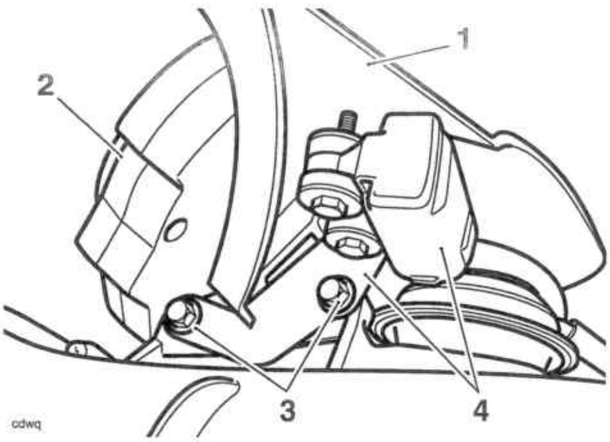
Note:

- **The starter solenoid has an additional 30 Amp fuse, attached directly to the solenoid, beneath the rider's seat.**

Instrument Pack

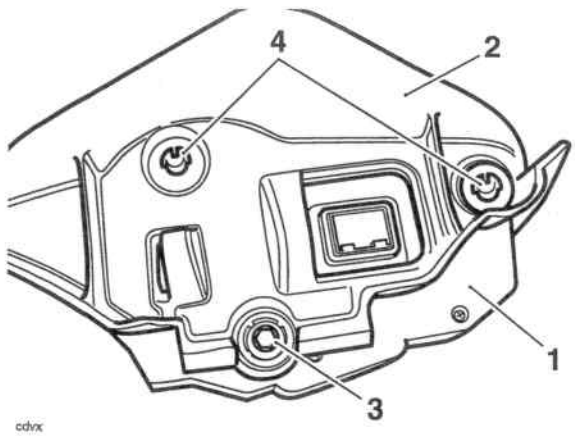
Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit (see page *16-16*).
4. Release the four fixings securing the instrument bracket to the air intake duct. Collect the fall detection switch and bracket from the right hand side of the instrument bracket.



1. Instrument bracket
2. Instrument pack
3. Instrument bracket fixings (right hand shown)
4. Fall detection switch and bracket

5. Raise the instrument pack and disconnect the electrical connection to the main harness. Remove the pack and bracket.
6. Release the fixing securing the instrument pack to the bracket.

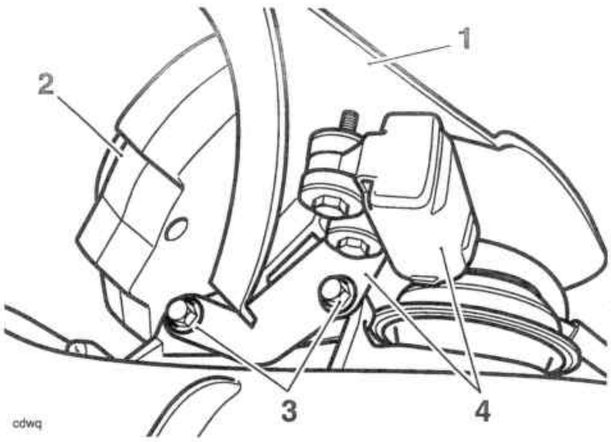


1. Instrument pack
2. Instrument bracket
3. Fixing
4. Stud/grommet fixings

7. Remove the instrument pack from the bracket.

Installation

1. Position the pack to the bracket
2. Insert the studs into the grommets.
3. Refit the fixing and tighten to **3 Nm**.
4. Connect the instruments to the harness.
5. Place the instrument bracket in position on the air intake duct and reposition the fall detection switch and its bracket. Refit the fixings.



1. Instrument bracket
2. Instrument pack
3. Instrument bracket fixings (right hand shown)
4. Fall detection switch and bracket

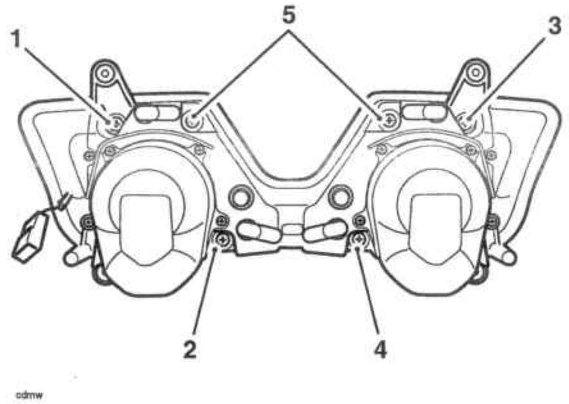
6. Tighten the bracket fixings to **7 Nm**.
7. Refit the cockpit (see page *16-16*).
8. Reconnect the battery, positive (red) lead first.
9. Refit the rider's seat (see page *16-11*).

Headlights

Headlight Adjustment

Note:

- Each headlight can be adjusted by means of vertical and horizontal adjustment screws located on the rear of each headlight.



1. Horizontal adjustment screw (left hand)
2. Vertical adjustment screw (left hand)
3. Horizontal adjustment screw (right hand)
4. Vertical adjustment screw (right hand)
5. Pivot screws (DO NOT adjust these screws)

1. Switch the headlight dipped beam on.

Caution

Do not adjust the pivot screws as this could cause the headlight reflector to become detached from the pivot screw, leading to irreparable damage to the headlight.

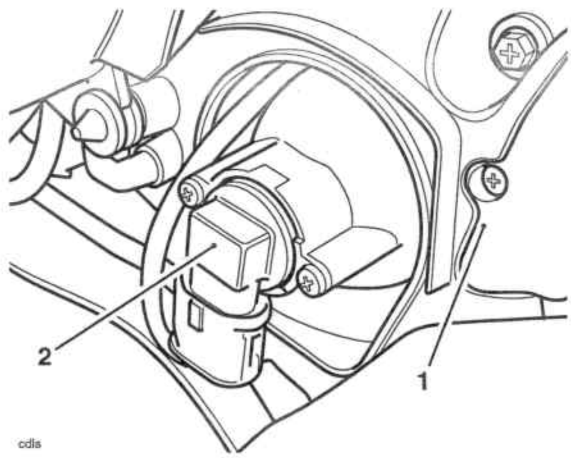
2. Turn the vertical adjustment screws on each headlight clockwise to raise the beam or anti-clockwise to lower the beam.
3. On the right hand headlight turn the horizontal adjustment screw clockwise to move the beam to the left or anti-clockwise to move the beam to the right.
4. On the left hand headlight turn the horizontal adjustment screw clockwise to move the beam to the right or anti-clockwise to move the beam to the left.
5. Switch the headlights off when both beam settings are satisfactorily set.

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 without dazzling oncoming traffic. An incorrectly adjusted headlight may impair visibility causing an accident.

Headlight Bulb Replacement



1. Headlight unit
2. Bulb retainer

Each headlight bulb can be replaced as follows:

Warning

The bulb becomes hot during use. Always allow sufficient time for the bulb to cool before handling.

Avoid touching the glass part of the bulb. If the glass is touched or gets dirty, clean with alcohol before re-use.

Warning

Do not reconnect the battery until the assembly process has been completed. Premature battery reconnection could result in ignition of the battery gases causing risk of injury.

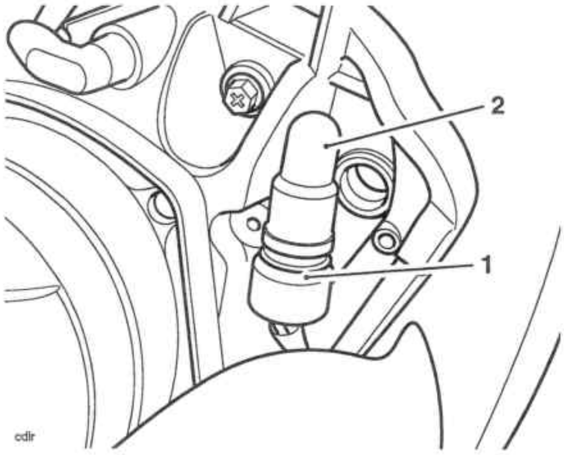
1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fairing infill panel (see page *16-13*).
4. Remove the four screws and remove the bulb cover from the bulb to be replaced.
5. Disconnect the multi-plug from the bulb retainer.

6. Detach the bulb retainer from the headlight assembly by rotating it counter-clockwise.
7. Remove the bulb from the bulb retainer.
8. Installation is the reverse of the removal procedure.
   - **When reconnecting the battery, connect the positive (red) lead first.**

Position Lamp Bulb Replacement

The position lamps are fitted to the left and right of each headlight. To replace a bulb, remove the two screws and remove the bulb cover, detach the rubber retainer from the headlight and pull out the bulb.

Installation is the reverse of the removal procedure.

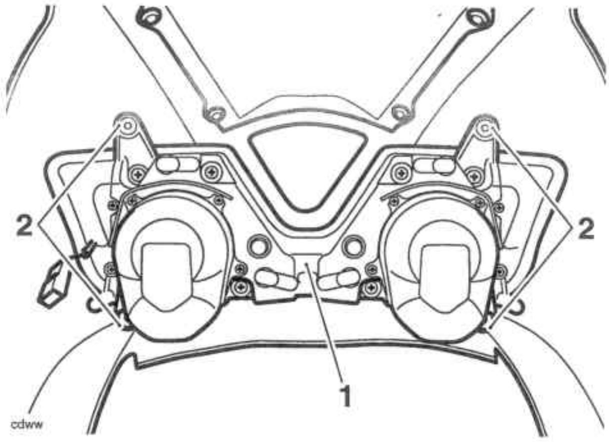


1. Bulb holder
2. Position lamp bulb

Headlight Assembly

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the cockpit (see page *16-16*).
4. Release the four fixings securing the headlight to the cockpit. Remove the headlight.



1. Headlight
2. Fixings

Installation

1. Installation it the reverse of removal, noting the following:

Note:

- **Tighten the headlight fixings to 3.5 Nm.**
- **Reconnect the battery, positive (red) lead first.**

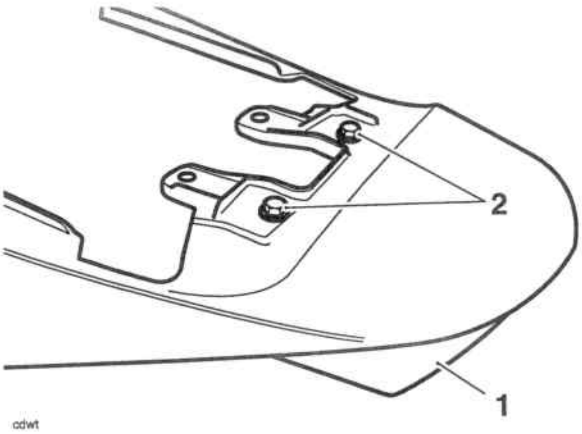
Rear Light

Removal

Note:

- **The rear light is a sealed for life unit and must be replaced in the event of a failure.**

1. Remove the seats (see page *16-11*).
2. Disconnect the battery negative (black) lead first.
3. Remove the rear panel (see page *16-12*).
4. Release the fixings securing the light unit to the rear panel.



1. Rear light unit
2. Rear light fixings

5. Remove the rear light.

Installation

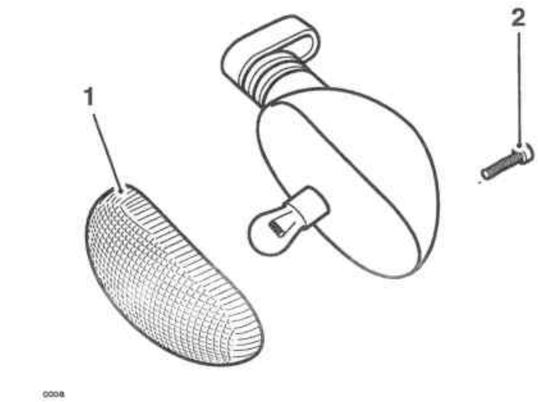
1. Installation is the reverse of the removal procedure.

Note:

- **Tighten the rear light to rear panel fixings to 4 Nm.**
- **Reconnect the battery, positive (red) lead first.**

Indicator Light

Bulb Replacement



1. Indicator lens
2. Screw

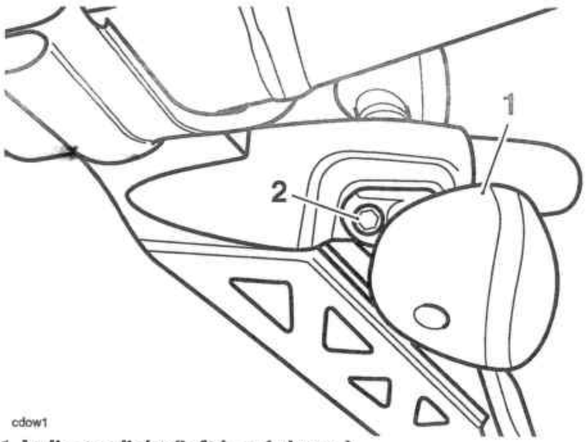
The lens on each indicator light is held in place by a securing screw located in the body of the light.

Release the screw and remove the amber lens to gain access to the bulb for replacement.

Rear Indicator Light

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery negative (black) lead first.
3. Release the fixing securing the indicator light to the licence plate bracket and detach the light unit.
4. Disconnect the two indicator light electrical connectors and remove the light unit.



1. Indicator light (left hand shown)
2. Fixing

Installation

1. Installation is the reverse of the removal procedure, noting the following.

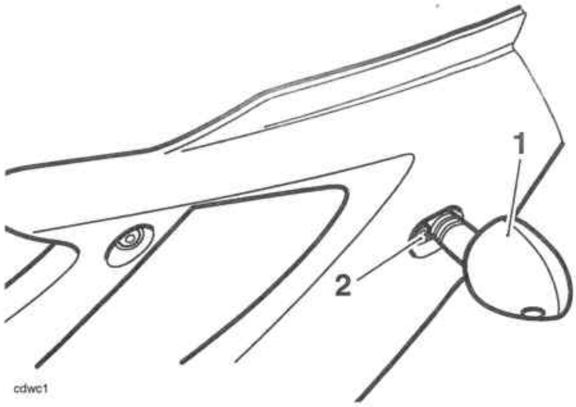
Note:

- **Tighten the indicator light fixing to 5 Nm.**
- **Reconnect the battery, positive (red) lead first.**

Front Indicator Light

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery negative (black) lead first.
3. Remove the lower fairing (see page *16-13*).
4. Release the fixing securing the indicator light to the lower fairing and remove the light unit.



1. Indicator light (right hand shown)
2. Fixing

Installation

1. Installation is the reverse of the removal procedure, noting the following.

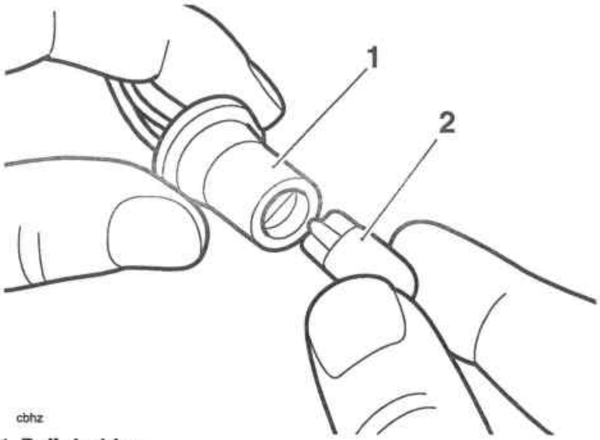
Note:

- **Tighten the indicator light fixing to 5 Nm.**
- **Reconnect the battery, positive (red) lead first.**

Licence Plate Light

Bulb Replacement

1. Release the screw and detach the licence plate light from the licence plate bracket.
2. Carefully remove the rubber bulb holder from the back of the light unit and remove the bulb.



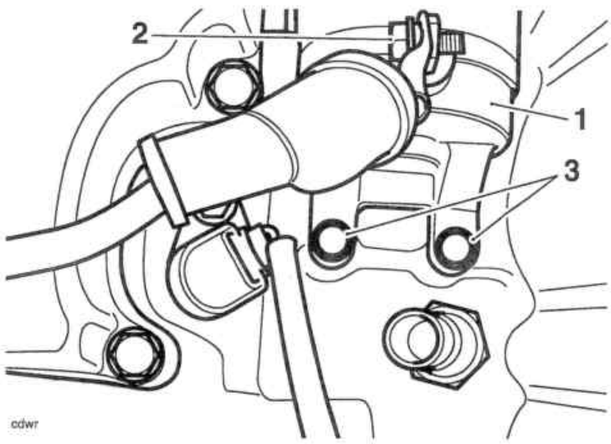
1. Bulb holder
2. Bulb

3. Installation is the reverse of the removal procedure.

Starter Motor

Removal

1. Remove the rider's seat (see page *16-11*).
2. Disconnect the battery, negative (black) lead first.
3. Remove the fuel tank (se page *10-105*).
4. Remove the airbox (see page *10-110*).
5. Remove the throttle bodies (see page *10-119*).
6. Disconnect the low oil pressure warning light switch.
7. Ease the boot from the starter cable terminal and then release the cable bolt.
8. Detach the cable.
9. Release the fixings securing the starter to the crankcase.



1. Starter motor
2. Starter cable fixing
3. Fixings

10. Ease the starter motor from the upper crankcase.

Inspection

1. Ensure the starter turns freely and without binding.
2. Check the starter O-ring for damage and deterioration. Replace as necessary.

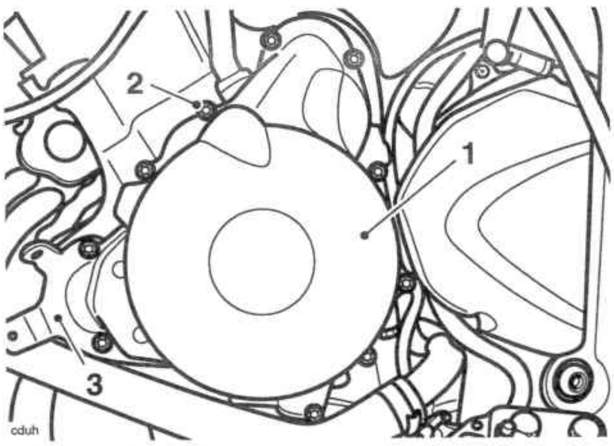
Installation

1. Lubricate the starter motor O-ring with a small amount of petroleum jelly
2. Fit the starter motor to the upper crankcase ensuring that the O-ring does not become damaged during installation.
3. Fit and tighten the starter bolts to **10 Nm**.
4. Refit the starter cable and secure with the bolt. Tighten to **7 Nm**.
5. Refit the starter cable boot.
6. Connect the low oil pressure warning light switch.
7. Refit the throttle bodies (see page *10-120*).
8. Refit the airbox (see page *10-111*
9. Refit the fuel tank (see page *10-106*).
10. Reconnect the battery, positive (red) lead first.
11. Refit the rider's seat (see page *16-11*).

Alternator

Removal

1. Remove the rider's seat (see page *16-11*).
2. Remove the right hand lower fairing (see page *16-13*).
3. Disconnect the battery, negative (black) lead first.
4. Release the bolts securing the left hand engine cover, noting the position of the copper washer under the head of one of the upper bolts. Collect the solenoid/fairing bracket from under the front two bolts.



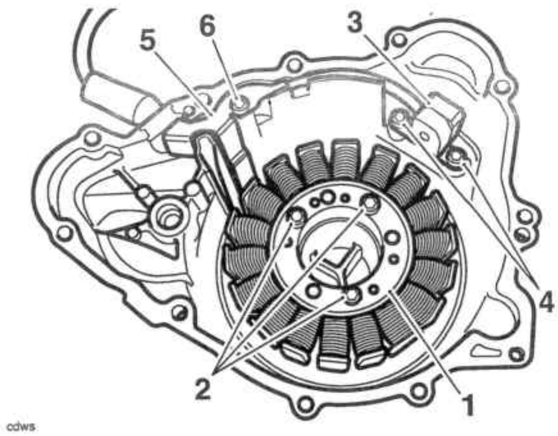
1. Left hand engine cover
2. Copper washer position
3. Solenoid/fairing bracket

5. Withdraw the cover from the crankcase against the pull of the alternator magnet.

Note:

- **The stator and crankshaft position sensor are supplied as an assembly and cannot be separated.**

6. To remove the stator and crankshaft position sensor from the cover, release the three bolts in the centre of the cover and release the bolt securing the cable bracket. Discard the bolts
7. Release and discard the fixings securing the crankshaft position sensor to the cover.



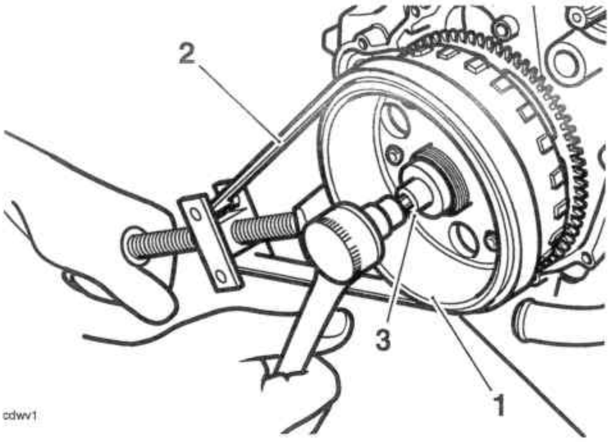
1. Stator
2. Stator fixings
3. Crankshaft position sensor
4. Crankshaft position sensor fixings
5. Cable bracket
6. Cable bracket fixing

8. Withdraw the stator and crankshaft position sensor.

Caution

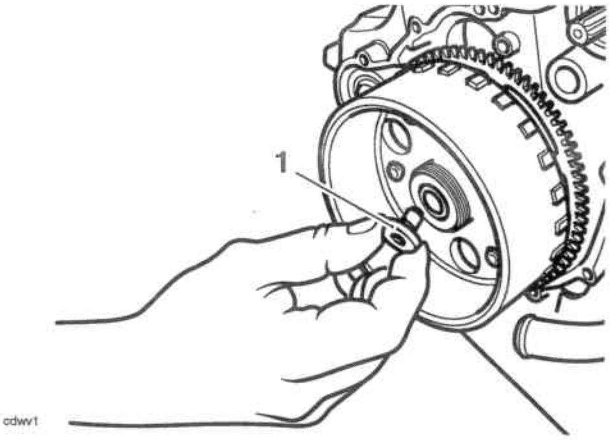
Do not use tools to tighten service tool T3880375. Tighten the tool by hand only. Over-tightening of the tool will lead to damage to the alternator rotor.

9. To remove the rotor, clean the alternator rotor to remove all traces of oil, and fit tool T3880375 to the rotor as shown below. Retain the tool to prevent the crankshaft from rotating and remove the centre bolt from the crankshaft.



1. Rotor
2. Tool T3880375
3. Centre bolt

10. With the bolt removed, locate the spigot from the larger of the two thrust pads supplied with tool T3880365 to the crankshaft.



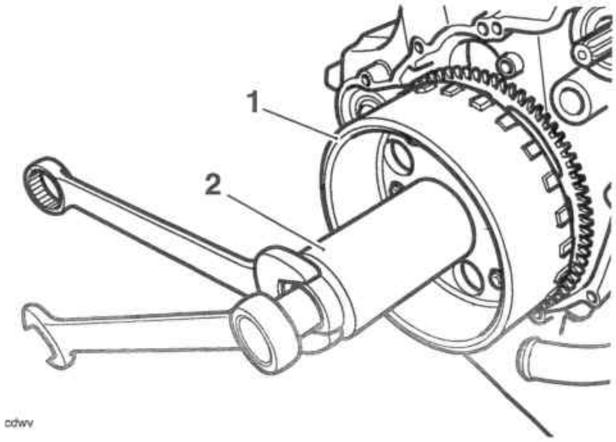
1. Thrust pad

11. Assemble tool T3880365 to the threaded centre section of the rotor.

Note:

- **Ensure that the thrust pad does not fall out during assembly of the tool.**

12. Hold the centre of the tool to prevent rotation then tighten the draw-bolt in the centre of the tool to release the taper seating of the rotor from the crankshaft.



1. Rotor
2. Tool T3880365

13. Withdraw the rotor and tool as an assembly and then separate the tool from the rotor. Collect the Woodruff Key and the tool thrust pad from the crankshaft.

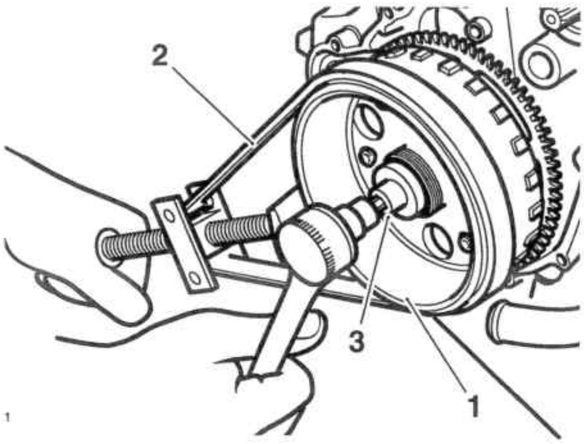
Assembly

1. Refit the Woodruff key to the crankshaft.
2. Assemble the rotor to the keyway on the crankshaft, ensuring the Woodruff key remains in position

Caution

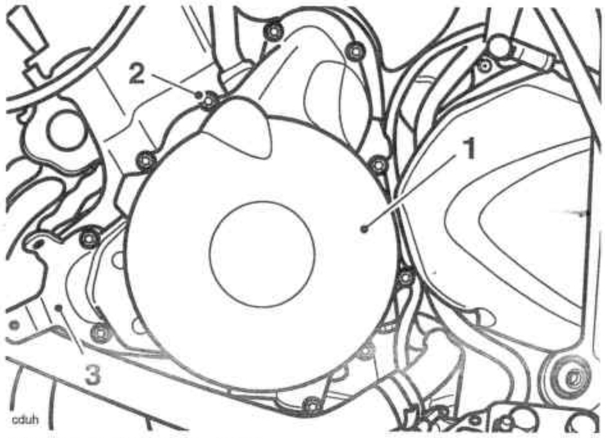
Do not use tools to tighten service tool T3880375. Tighten the tool by hand only. Over-tightening of the tool will lead to damage to the alternator rotor.

3. Refit tool T3880375 to prevent the crankshaft from rotating, ensuring the rotor is free from oil and the tool is not over-tightened.
4. Tighten the rotor retaining bolt to **120 Nm**.



1. Rotor
2. Tool T3880375
3. Centre bolt

5. Remove tool T3880375.
6. Locate the stator and crankshaft position sensor to the engine cover.
7. Apply silicone sealer to the cable grommet (at the factory, ThreeBond 1215 is used) and align the cable to the exit slot.
8. Fit the cable retainer bracket and tighten a new retainer bolt to **6 Nm**.
9. Tighten the new stator bolts to **12 Nm**.
10. Tighten the new crankshaft position sensor bolts to **6 Nm**.
11. Position a new gasket to the crankcase dowels then refit the left hand engine cover.
12. Ensure the bolt with the copper washer is correctly located. Refit the solenoid/fairing bracket to the front two bolts. Tighten the cover bolts to **9 Nm.**



1. Left hand engine cover
2. Copper washer position
3. Solenoid bracket

13. Refit the right hand lower fairing (see page *16-14*).
14. Reconnect the battery, positive (red) lead first.
15. Refit the seat (see page *16-11*).

Alternator Rectifier

Note:

- **The alternator rectifier is located in between the rear suspension unit and the gearbox. To access the rectifier connector, remove the fuel tank (see page *10-105*). The rectifier does not contain any serviceable parts and must be replaced if faulty.**

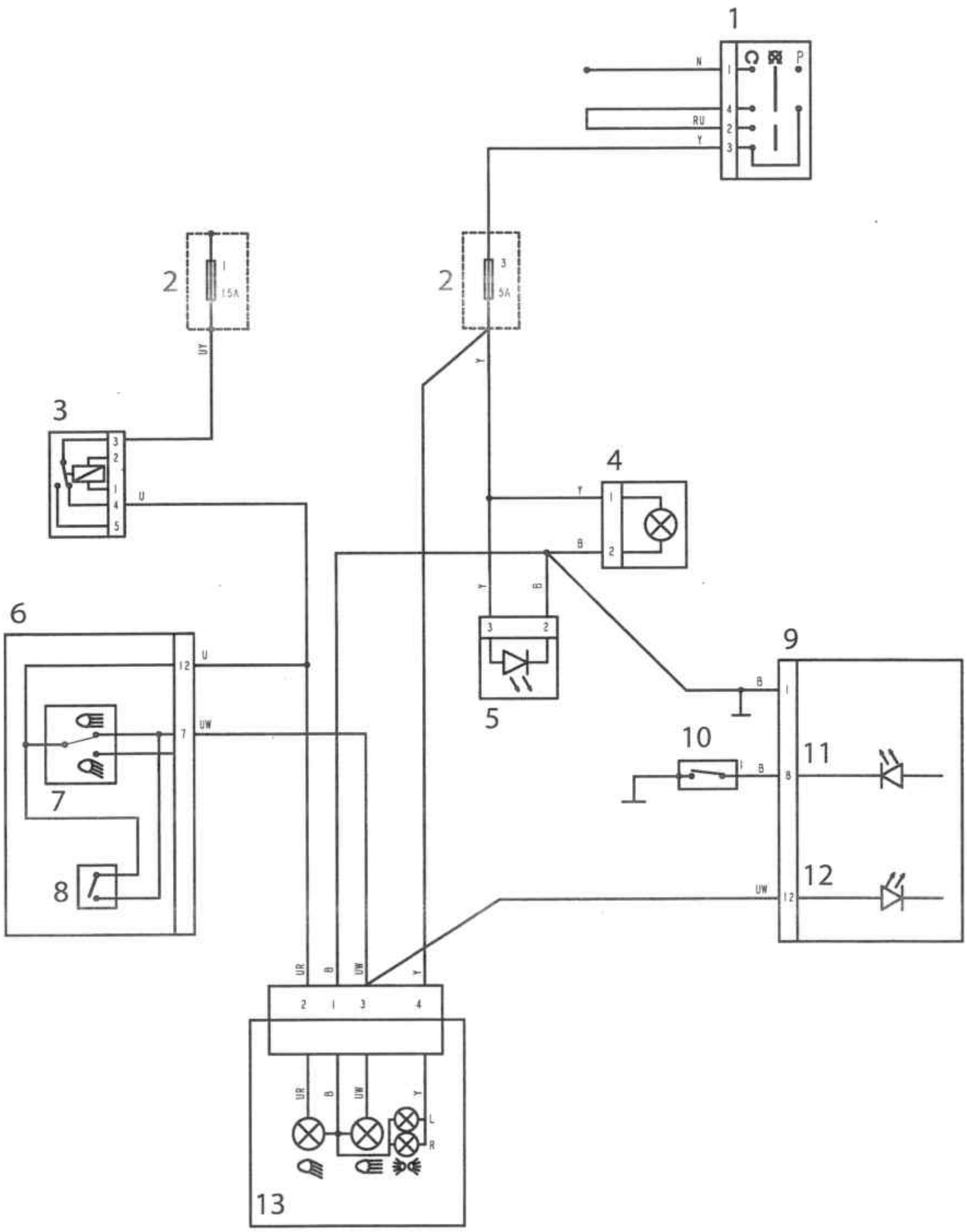
Lighting circuit

Key to circuit diagram

Key	Item Description
1	Ignition switch
2	Fuse box (Fuse 1 and 3)
3	Starter relay
4	Number plate lamp
5	Tail light
6	Left hand switch cube assembly
7	Main / dip beam switch
8	Pass switch
9	Instrument assembly
10	Oil pressure switch
11	Oil pressure warning light
12	Main beam warning light
13	Headlight

Key to wiring colours

Key	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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5A
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6
U
UW
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8
9
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10
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11
UW
12
UR
B
UW
Y
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13

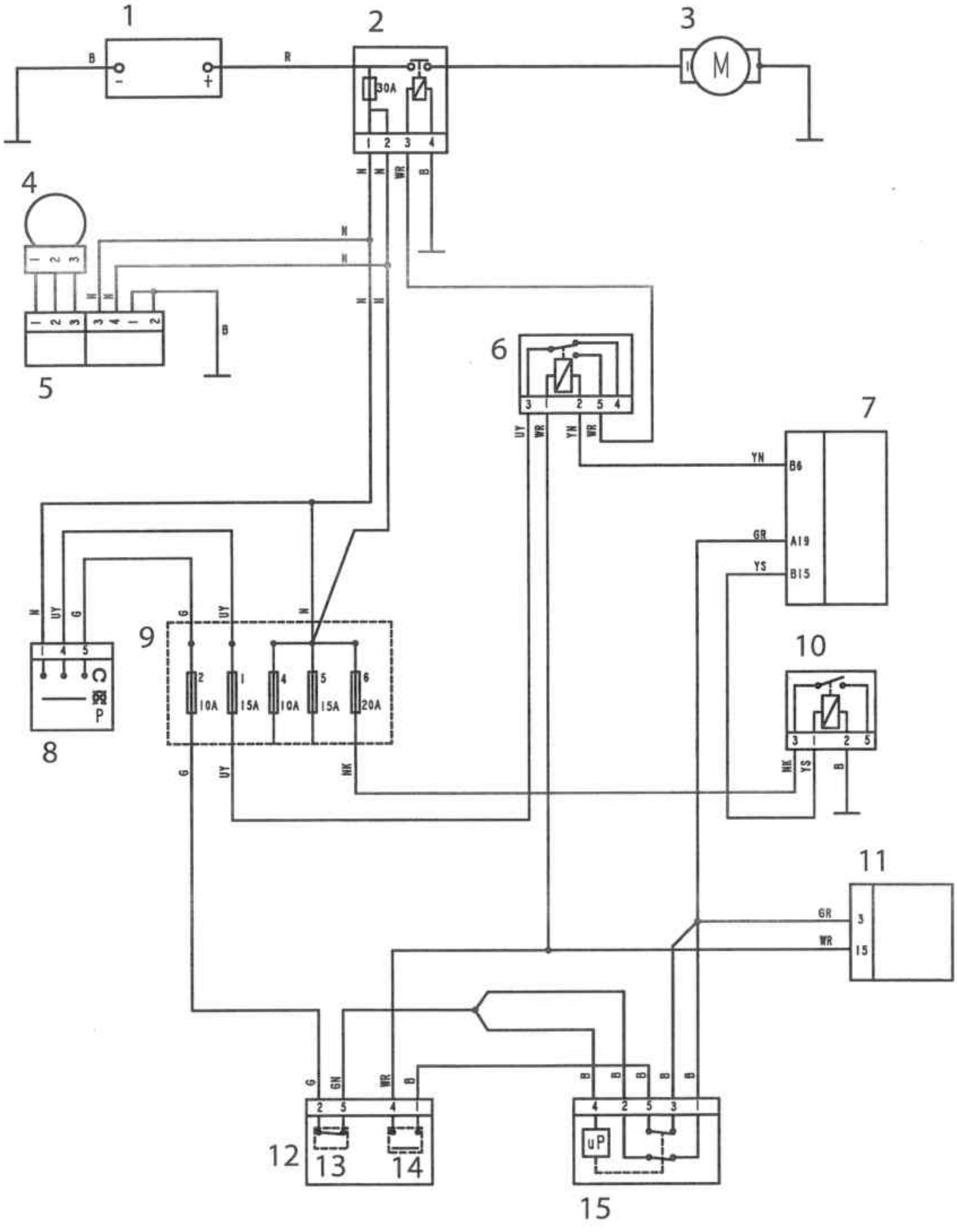
Starting and Charging Circuit

Key to circuit diagram

Key	Item Description
1	Battery
2	Starter solenoid
3	Starter motor
4	Alternator
5	Regulator / rectifier
6	Starter relay
7	Engine control module
8	Ignition switch
9	Fuse box (Fuses 1, 2 and 6)
10	Engine control module relay
11	Instrument assembly
12	RH switchcube
13	Engine stop switch
14	Starter switch
15	Alarm

Key to wiring colours

Key	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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30A
M
10A
15A
10A
15A
20A
B6
A19
B15
YN
GR
YS
WR
UY
NK
uP

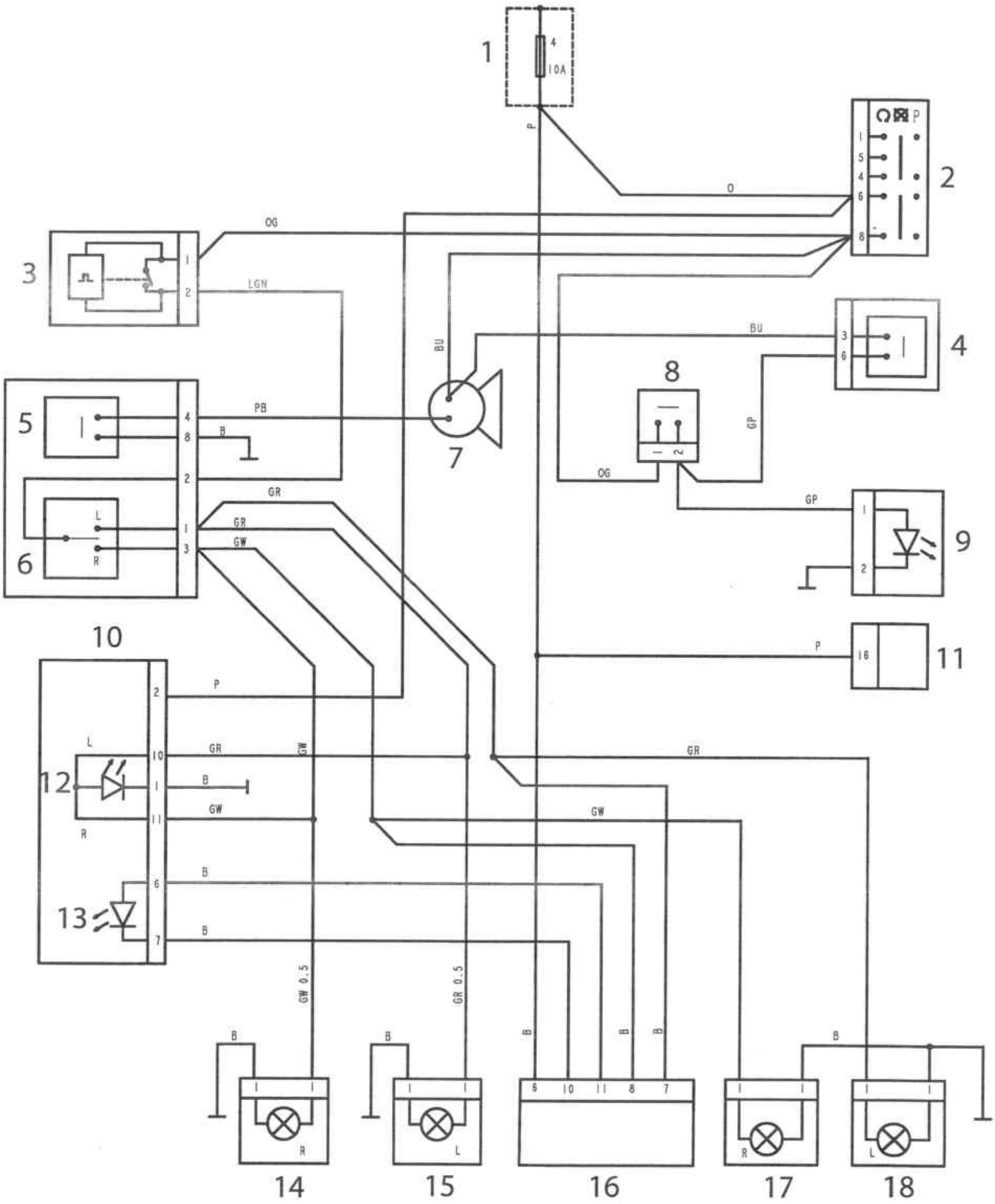
Auxiliary and Accessory Circuit

Key to circuit diagram

Key	Item Description
1	Fuse box (Fuse 4)
2	Ignition switch
3	Indicator relay
4	Front brake light switch
5	Horn switch
6	Direction indicator switch
7	Horn
8	Rear brake light switch
9	Brake light
10	Instrument assembly
11	Diagnostic connector
12	Direction indicator (Instruments)
13	Alarm LED
14	Front right direction Indicator
15	Front left direction Indicator
16	Alarm unit
17	Rear right direction indicator
18	Rear left direction indicator

Key to wiring colours

Key	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


1
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GW
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10
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11
GR
GR
12
B
GW
GW
13
B
B
GW 0.5
GR 0.5
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16
17
18

Complete System

Key to circuit diagram

Key	Item Description
1	Instrument assembly
2	Vehicle speed sensor
3	Front brake lever switch
4	Engine stop switch
5	Starter button
6	Exhaust control valve actuator
7	Engine control module
8	Gear position sensor
9	Lambda sensor
10	Fuel injector 1
11	Fuel injector 2
12	Fuel injector 3
13	Secondary air injection solenoid
14	Low fuel sensor
15	Idle speed control actuator
16	Fall detection switch
17	Inlet air temperature sensor
18	Throttle potentiometer
19	Oil pressure switch
20	Coolant temperature sensor
21	Ambient pressure sensor
22	MAP sensor
23	EMS main relay
24	Purge valve
25	Ignition coil 1
26	Ignition Coil 2
27	Ignition coil 3
28	Fuel pump
29	Cooling fan relay
30	Cooling fan
31	Intake flap actuator
32	Sidestand switch
33	Engine ground
34	Crankshaft sensor
35	Diagnostic connector
36	Rear brake lever switch
37	Rear light
38	RH rear indicator
39	Number plate light
40	LH rear indicator
41	Alarm connector (accessory)
42	Starter motor
43	Starter solenoid (fused)
44	Battery
45	Starter relay
46	Rectifier / regulator
47	Alternator
48	Fuse box
49	Ignition switch
50	Clutch lever switch
51	Horn button
52	Direction indicator switch
53	Headlamp dip switch
54	Direction indicator unit
55	LH front indicator
56	LH position light
57	RH position light
58	Dip beam bulb
59	Main beam bulb
60	Horn
61	RH front indicator

Key to wiring colours

Key	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