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SHEPPARD CYCLES AUSTRALIA PTY LTD (ABN 98 608 591 724)

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FOR BICYCLES PURCHASED IN AUSTRALIA.

OR

SHEPPARD CYCLES NEW ZEALAND LTD

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PO BOX 62 067, AUCKLAND 1641, (PH: +64 9 915 5770)

FOR BICYCLES PURCHASED IN NEW ZEALAND.

WWW.SHEPPARDCYCLES.COM

Malvern Star



OWNER'S MANUAL

Read this before using your new bicycle

PURCHASE RECORD CARD *Fill in immediately and retain as a record of your purchase!*

OWNERS NAME -----

ADDRESS -----

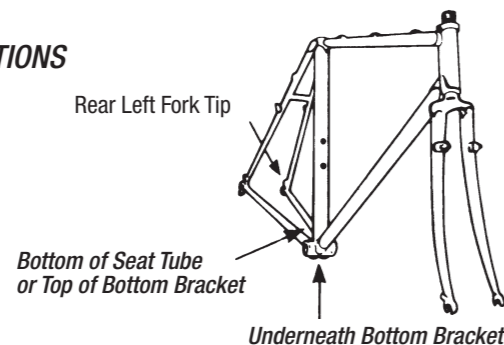
SERIAL NUMBER -----

DATE PURCHASED ----- PLACE OF PURCHASE -----

BRAND ----- MODEL NAME -----

WHEEL SIZE ----- COLOUR -----

SERIAL NUMBER POSSIBLE LOCATIONS



CONSUMER GUARANTEES UNDER THE AUSTRALIAN CONSUMER LAW

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

MALVERN STAR* DEFECTS WARRANTY Ref F17/MALVERN STAR

Separately from the Consumer Guarantees, Sheppard Cycles warrants to the original purchaser (the "Purchaser") of a Malvern Star brand bicycle that this bicycle and certain identified parts of it when used for normal riding purposes is free from defects in workmanship and materials for the relevant periods nominated below. This documents sets out the terms of this defects warranty and does not affect or limit any rights under the Consumer Guarantees. The benefits to the consumer given by this warranty are in addition to other rights and remedies of the consumer under the Australian Consumer Law.

The Purchaser's attention is drawn to the following:

(a) this bicycle is only designed and intended for the purpose of normal riding and is specifically not designed or intended for any other uses including jumping, stunt riding, participation in "Motocross" bicycle riding, Mountain Bicycle Racing or other uses not recommended in the owner's manual; (b) Australian sunshine produces some of the highest levels of ultra violet rays in the world which has the effect of causing paintwork to fade quickly and it is usual for this fading to be more noticeable, and to occur at a faster rate, in neon or fluorescent paints (despite the presence of ultra violet inhibitors in the paint); and (c) this defects warranty is given by Sheppard Cycles in addition to any consumer guarantees implied by law which cannot be excluded. To the extent permitted by law and as part of the terms of the sale of the bicycle or part:

- Sheppard Cycles shall not be liable for any form of loss, damage, cost, injury or harm of any kind (whether direct, indirect, special or consequential) howsoever arising from the use or supply of the bicycle to the Purchaser other than as set out in this defects warranty or as required by applicable consumer guarantee laws; and
- the Purchaser holds Sheppard Cycles harmless from any such loss, damage or cost; and
- the Purchaser and Sheppard Cycles and the Sheppard Cycles retailer agree to exclude any warranty implied by law to the extent which such warranties may lawfully be excluded by agreement.

What this defect warranty covers and term of defect warranty

This defects warranty only covers bicycles that have a wheelbase exceeding 640mm or have a wheel size of 16" (40cm) and larger. This warranty will not apply if the bicycle is used for off-road riding or other uses not recommended in the owner's manual.

This warranty covers:

- a standard steel frame, alloy frame or carbon frame for as long as the original purchaser owns the bicycle;
- suspension frames (including but not limited to, all suspension attachment points, bushings, pivots, fasteners, stays and shock units) for two years;
- a suspension fork for 2 years
- a standard fork for 2 years
- all other parts of the bicycle (including paint finish, but excluding tyres, tubes and wheels) for 30 days.

Please note that the fork is not a part of the frame. A lifetime warranty on your frame does not guarantee that the bicycle will last forever. The length of the life of the bicycle will vary depending on the type of the bicycle, riding conditions and care the bicycle receives.

Exceptions to this defects Warranty

This defects warranty does not apply:

- (a) where the bicycle or any part of it:
- fails due to an accident, abuse, neglect or normal wear and tear;
 - has been subjected to a use for which it was not designed or intended or promoted by Sheppard Cycles;
 - has had a motor attached or has been used for hire, rental or any other commercial purpose;
 - has been modified or is otherwise than as supplied by Sheppard Cycles; or
 - does not consist solely of original parts or equipment;
- (b) where any defect, malfunction or other failure of the bicycle or any part of it resulted directly or indirectly from a person other than Sheppard Cycles authorised person adjusting or failing to adjust any part requiring normal maintenance and service (examples include adjustment of brakes and derailleur mechanisms, tyre inflation, lubrication, and tightening of screws, nuts and bolts).
- (c) where coverage for suspension components shall be warranted for the original manufacturer's warranty period as noted in the respective owner's manual where supplied.

This warranty only applies to the original Purchaser and only if the bicycle or the failed part was purchased from an authorised Sheppard Cycles retailer.

It may not be transferred by the Purchaser to any other person.

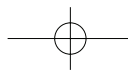
Claiming on this Defects Warranty

The defects warranty may be claimed on only in the following manner:

1. In order to make a claim under this warranty, the Purchaser must deliver the bicycle or the relevant part to the Sheppard Cycles retailer from whom the bicycle or part was purchased and must pay all costs of transportation to the Sheppard Cycles retailer.
2. The Purchaser must deliver to the Sheppard Cycles retailer written reasons why the Purchaser considers that the Purchaser has a claim under this defects warranty and must provide all necessary details, including:
 - the bicycle or part involved (by Brand, Model and Serial No.);
 - the place, date and from whom the bicycle or relevant part was purchased; and
 - the defect, malfunction or failure in respect of which the warranty claim is being made.
3. If this warranty applies to the bicycle or relevant part, Sheppard Cycles will repair the bicycle or relevant part.
4. If Sheppard Cycles cannot repair the bicycle or the relevant part within 12 weeks after receipt of the claim, Sheppard Cycles will replace the bicycle or relevant part with a comparable non-defective product or part without charge to the Purchaser.
5. If after examining the bicycle Sheppard Cycles considers that the bicycle proves not to be defective within the terms of this warranty, then subject to implied consumer guarantees which cannot be excluded all reasonable costs and expenses relating to the processing of the Purchaser's warranty claim shall be borne by the customer.

*The Brand described above is a registered trade mark of Sheppard Cycles.

ABN 98 608 591 724



You have chosen one of the finest bicycles available. Your bicycle has been carefully manufactured with the benefit of years of experience and fully tested to ensure the highest standards of safety and comfort for the rider.

In order to fully enjoy your bicycle, a certain amount of care and maintenance is required.

This Owner's Manual is not intended as a fully comprehensive workshop manual but it will guide you in the assembly, safe usage and correct maintenance of your new bicycle. If you have any doubt or difficulty with any of the tasks described, please seek the assistance of a specialist bicycle dealer.

Please read the Manual thoroughly, paying special attention to the safety warnings. This Manual will help ensure that your new bicycle keeps working properly and safely, and continues to give you years of enjoyable cycling.

GENERAL WARNING:

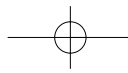


Bicycling can be a hazardous activity even under the best of circumstances. Proper maintenance of your bicycle is your responsibility as it helps reduce the risk of injury. This Manual contains many "Warnings" and "Cautions" concerning the consequences of failure to maintain or inspect your bicycle. Many of the Warnings and Cautions say "you may lose control and fall". Because any fall can result in serious injury or even death, we do not repeat the warning of possible injury or death whenever the risk of falling is mentioned.

The bicycle you have purchased is a complex article. The following manual is only a guide to assist you and is not a complete or comprehensive manual of all aspects of maintaining and repairing your bicycle. The Company has taken all reasonable care to ensure that the manual is accurate and the information is current as at February 2016.

The Company recommends you consult a specialist bicycle dealer particularly if:

- . you have any doubts or concerns as to your experience or ability to properly repair or maintain your bicycle;
- . the following manual does not cover a particular matter; or
- . you have any other questions or concerns.





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Warning/Important
(Take notice of this symbol throughout this manual)

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Bicycles are available in a variety of different styles and sizes designed for different uses. Despite the different styles, all are made up of a frame, wheels, drivetrain, saddle, handlebar assembly and brakes. Study and familiarise yourself with the names of various parts on the diagram similar to your bicycle. This will help when you come to the assembly and basic maintenance instructions described later in this manual.

Care For Your Carbon Frame

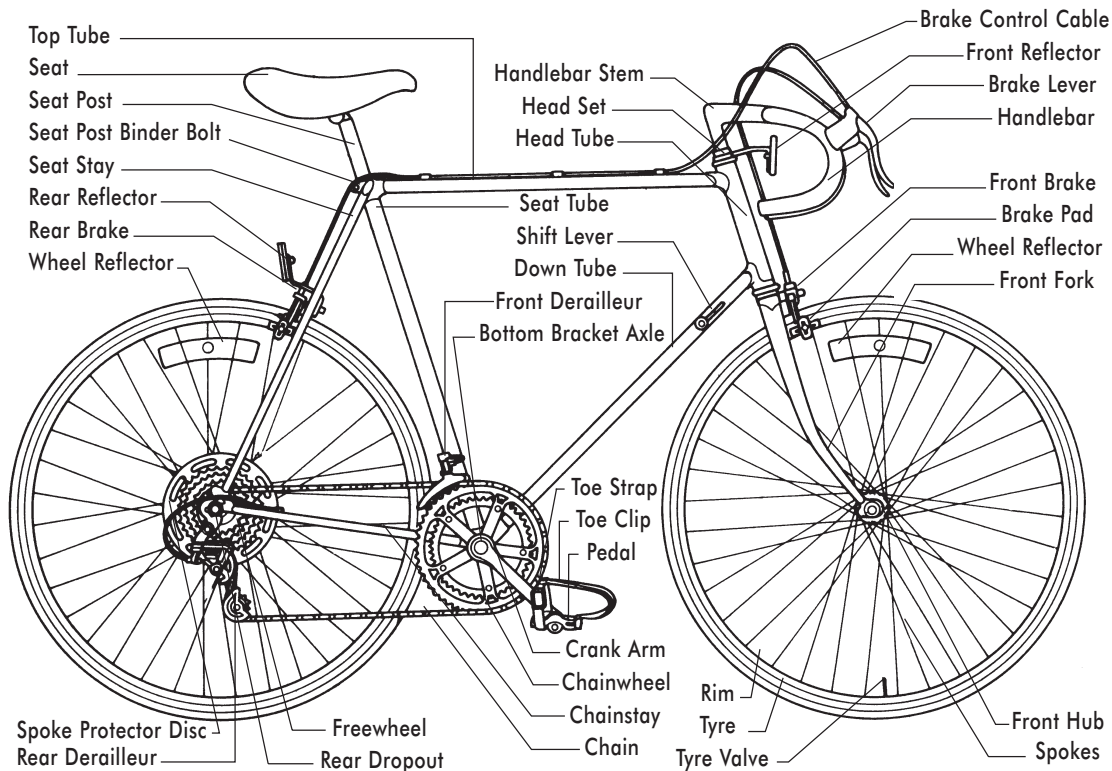
•Assembly & Maintenance - when assembling or carrying out maintenance on your carbon framed bicycle it is recommended to hold the bicycle in a workstand by the seatpost or use an internal seatpost clamp.

•Carrying your Carbon Frame Bike on a Motor Vehicle - when carrying your carbon framed bicycle on a motor vehicle it is recommended to use a carrying device where the bicycle is held by the wheels and/or fork dropouts and not direct clamping of the frame.

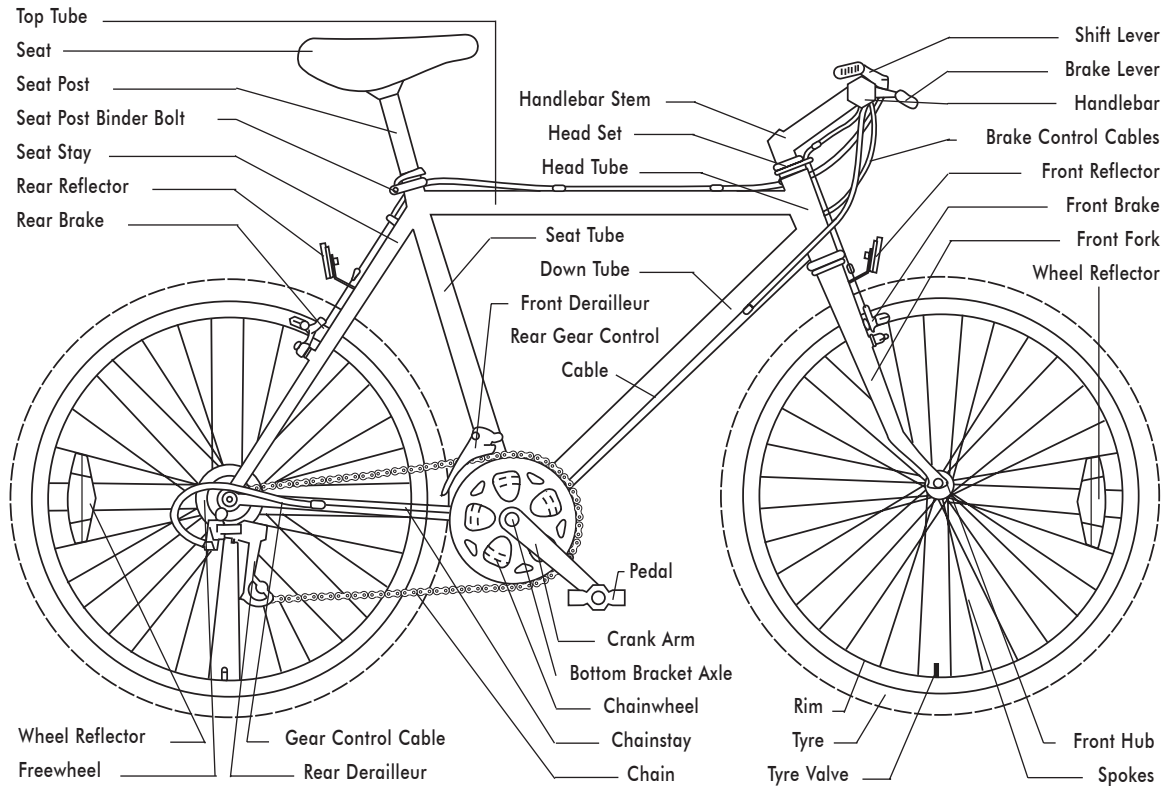
•Failure to do so may cause the frame to crack due to un-natural forces on the frame.

Racing Bicycles

Racing style, or road bicycles, are light in weight and are designed for fast travel over long distances on paved surfaces.



Mountain Bicycles & Crossbikes . Mountain bicycles are designed to give maximum comfort over a wider variety of road surfaces. The wider handlebars and convenient shift lever position make them very easy to control. Wider wheel rims and tyres give them a softer ride with more traction on rough surfaces. The frame and fork on mountain style bicycles is much sturdier and heavier than a racing style bicycle. A variation of the mountain bicycle is the crossbike or hybrid. This style of bicycle is lighter than a mountain bicycle but not as fast as a racing bicycle. It combines some of the features of comfort and control with lighter weight and higher speed.

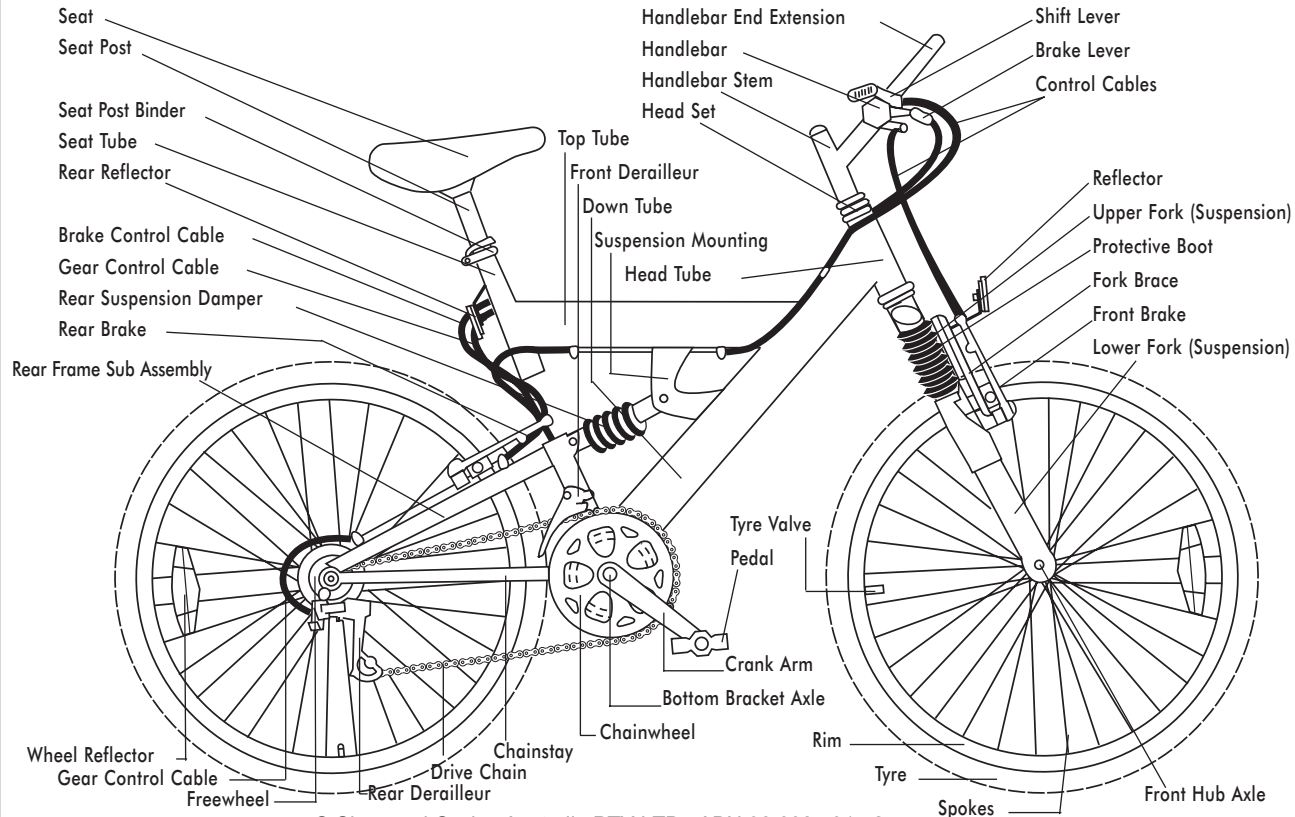


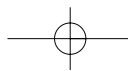
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Suspension Bicycles . With similar components to standard frame mountain bicycles, suspension fitted bicycles give even more comfort over uneven road surfaces. Some are fitted with shock absorbing front forks only, while others are designed with special frames which also have a rear suspension mechanism. In addition, some bikes may be fitted with a special shock absorbing seat pillar or even a handlebar stem to cushion and relieve road shocks and add to rider comfort. Like standard mountain bikes, wide handlebars and conveniently positioned shift levers make them easier to control. Wide rims and tyres add to a softer ride while enhancing traction over rough surfaces. Suspension bikes come in a variety of styles but the basic components are similar.

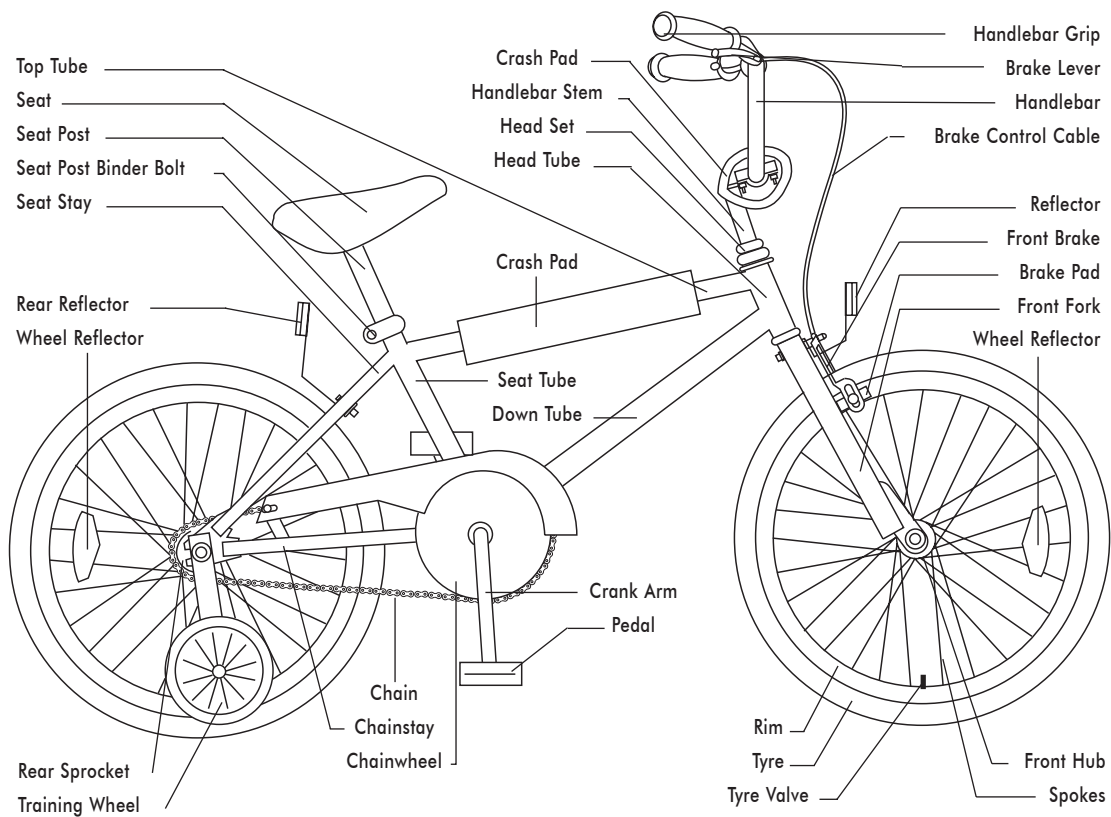




BMX Bicycles . BMX style bicycles are a popular general purpose type most suited to younger riders.

They are valued because of their sturdy and simple construction and low maintenance.

Other kinds of children's bicycles use different styles of frames such as the loop frame and the U-shape frame.



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PART 2 • ASSEMBLY

Your new bicycle was assembled and tuned in the factory and then partially disassembled for shipping.

You may have purchased the bicycle already fully re-assembled and ready to ride OR in the shipping carton in the partially disassembled form. If it was purchased in the carton the following instructions will enable you to prepare your bicycle for years of enjoyable cycling.

Please check that all parts referred to in the instructions and shown in the photographs/diagrams have been included, and that all tools needed are at your disposal.

For more detail on inspection, lubrication, maintenance, additional tools needed and adjustment of any area please refer to the relevant section elsewhere in this manual.

You will need the following tools:

Spanners, ring or open ended - 8mm, 10mm, 12mm, 13mm, 14mm and 15mm, or adjustable wrenches.

Spanners, open ended narrow - 15mm.

Torque Wrench with newton meter graduations.

Phillips head screwdriver.

Blade ended screwdriver.

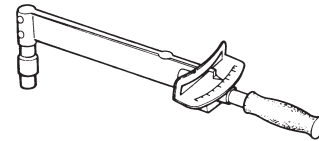
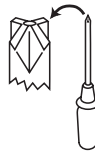
Bicycle pump

Allen key - 5mm and 6mm.

Standard slipjoint pliers



It is recommended that a torque wrench be used in the initial assembly process and that the torque requirements listed on Page 36 be adhered to.



DERAILLEUR GEARED BICYCLES

Includes 20"(51cm), 24"(61cm) and 26"(66cm) wheel Mountain Bikes, 27"(69cm) and 700C Touring and Racing Bikes, and 700C Crossbikes.

Assembly is the same for female and male models.



1 . Getting Started

Open the carton from the top and remove the bicycle.
Remove the straps holding the front wheel, handlebar assembly, and the package containing the pedals, seat and seat pillar.
Remove the protective wrapping from the bicycle.

2 . Handlebars

Remove the protective cap from the handlebar stem and loosen the Allen key bolt using the 6mm Allen key. Some models may use a 13mm hexagonal bolt instead of an Allen key bolt. Place the handlebar stem into the top of the head tube, ensuring all cables are free of tangles. Tighten the handlebar stem in the frame while observing the minimum insertion mark and checking that the forks and handlebars are both facing forward. Ensure that the handlebar binder clamp on the stem is tightened. For MTB bicycles supplied with handlebar end extensions, these can now be fitted to the exposed ends of the handlebar. Set the angle to your personal preference, ensuring both are fitted at the same angle. End plugs must be fitted and the clamp bolts must be firmly tightened.



The handlebar stem must be inserted so that the minimum insertion mark cannot be seen.



A



3 . Seat

Insert the smaller end of the seat pillar into the seat clamp and tighten. Insert the seat/pillar assembly into the frame tube of the bicycle observing the minimum insertion mark on the seat pillar. Ensure the seat is level and facing the front. Tighten with a 13mm ring spanner. If your bicycle is fitted with a Quick Release type seat bolt, turn the adjusting nut to ensure the locking lever is moved to the closed position with a firm action. Refer to Page 41 for more detail about quick release mechanisms. Turn the bicycle upside down and rest it on the seat and handlebars.



The seat pillar must be inserted so that the minimum insertion mark cannot be seen.

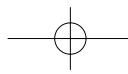


4 . Pedals

Attach the pedals carefully, engaging the thread initially by hand. Note that the right hand pedal attaches to the chainwheel side crank with a right hand (clockwise) thread. The left pedal attaches to the other crank arm and has a left hand (counter clockwise) thread. The ends of each pedal spindle are marked with either an 'R' for right or 'L' for left. Tighten pedals very firmly using a narrow 15mm open ended spanner. Note, damage will occur if pedals are not correctly and firmly attached.



Attachment of an incorrect pedal into a crank arm will cause irreparable damage.



5 . Front Wheel

Insert the front wheel into the forks. Where supplied ensure that the specially shaped washer, sometimes with a small tab, under the wheel nut is located in the forks. This tab will ensure that the wheel will not fall out should the nuts become loose. Note that some mountain bicycle forks are designed with a special recess built in so that retention washers are not required. Tighten the wheel nuts using the appropriate 14mm or 15mm spanner. If the wheel is fitted with a Quick Release type axle, turn the adjusting nut so that the locking lever is moved to the closed position with a firm action.

Refer P.39 for more detail about Quick Release mechanisms.

Turn the bicycle upright using the kickstand, where provided, to support it.



6 . Front Brake

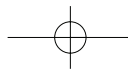
Brakes must be adjusted and firmly tightened so that the brake shoes are correctly aligned with the rim, and have minimal clearance with the rim before the control lever is squeezed. Your bike may be fitted with sidepull, cantilever, "V" style, or other types of brakes but the same adjustments must be made. Be sure that the right hand control lever operates the front brake, and the left lever operates the rear brake.

To connect the front brake, position yourself so you can comfortably squeeze the brake calipers together with one hand while adjusting and fastening the brake cable with the other hand.

If your bike is fitted with "sidepull" type brakes grasp and firmly squeeze the caliper with one hand so that the brake pads are touching the rim. Loosen the eyebolt holding the brake cable with a 10mm spanner, firmly pull the cable through the hole, and then re-tighten.

If fitted with "cantilever" type brakes position the straddle cable into the straddle cable holder above the reflector bracket and connect the cable end into the brake arm. With the cable fitted the straddle holder should sit 10-20mm above the reflector bracket and can be adjusted via the eyebolt using a 10mm spanner.

To connect and adjust "V" style or "Linear Pull" type brakes, use a 10mm spanner or Allen key to set the brake shoes to within 2mm of, and parallel to, the rim with the brake arms in a vertical position. Position the drum shaped end button of the control





cable into the hand brake lever. Loosen the cable eyebolt on the left hand brake arm. Thread the cable through both brake arms, positioning the curved outer casing runner through the right arm, and the inner wire through the eyebolt on the left arm. Squeeze the brake arms together, pull the cable wire through the eyebolt, and tighten it.

Adjust the brake pads and tighten with appropriate 10mm spanner or Allen key so they contact squarely with and are aligned parallel to the rim surface. Firmly squeeze the control lever and check the brake pads are 1.5mm to 2mm away from the rim each side after lever is released. If clearance needs adjusting loosen the eyebolt, hold the brake arms in position so the pads just touch the rim, pull the cable tight, then re-tighten the eyebolt. Firmly squeeze the lever again and re-check clearance. Adjust again as above if clearance excessive, or fine tune by turning the cable adjusters at the lever. Ensure end cap is fitted to cable to prevent fraying. Connecting and adjusting rear brakes follows similar procedures as for the front.

For more details refer to Brakes section under Detailed Maintenance further on in the manual.



Do not ride the bicycle until the brakes are functioning properly. To test, apply the brakes while trying to push the bike forward to make sure they will stop the bicycle.

8. Gears

Gears are preset at the factory and normally will not require further adjustment before riding. However before testing them check that the 10mm anchor bolts which clamp the front and rear derailleur control cables are firmly fastened. Only then test the gears ensuring the drive chain moves freely into each position when the control levers are activated. If further adjustment is needed, refer to the Derailleur Systems section under Detailed Maintenance further in this manual.

9 . Finally

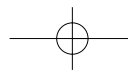
If your bike is supplied with a water bottle and cage, the cage should now be attached to the frame as illustrated using the Allen head bolts supplied. Check tyre pressure is inflated to the range recommendation on the tyre sidewalls. Attach the orange reflectors to the spokes of both wheels directly opposite the valve stem and within 76mm of the rim. Attach the white reflector to the front reflector bracket, and the red reflector to the rear reflector bracket using an 8mm spanner or Phillips head screwdriver. Attach the bell to the left handlebar near the grip. Check and adjust the gears if necessary before riding.



Before riding ensure all nuts, bolts and fittings on the bicycle have been correctly tightened.

Correct maintenance of your bicycle will ensure many years of happy and safe riding. Service your bicycle regularly yourself, by referring to the relevant sections of this manual, OR take it to your specialist bicycle shop.





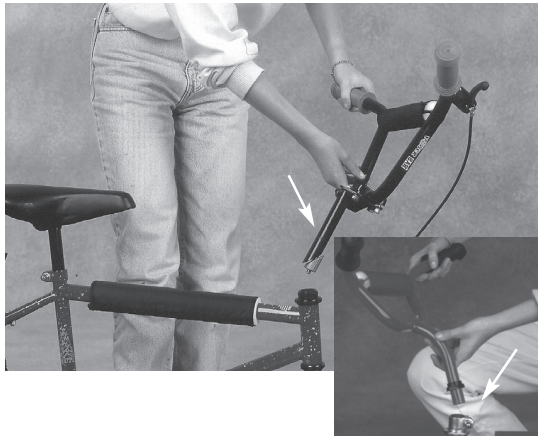
SINGLE SPEED BICYCLES (COASTERS AND FREEWHEELS)

Includes 12"(30cm), 16"(40cm) and 20"(51cm) wheel BMX and MTB style bicycles, 16"(40cm) and 20"(51cm) U-Frame and Loop Frame bicycles. Assembly is the same for girls and boys models.



1 . Getting Started

Open the carton from the top and remove the bicycle.
Remove the straps holding the front wheel, handlebar assembly, and the package containing the pedals, seat and seat pillar.
Remove the protective wrapping from the bicycle.

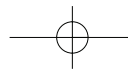


2 . Handlebars

Remove the protective cap from the handlebar stem and loosen the centre bolt using a 13mm spanner. MTB models may use a 6mm Allen key bolt instead. Insert the handlebar stem, with handlebars attached, into the head tube of the bicycle, re-tighten it while observing the minimum insertion mark and ensuring both the forks and handlebar assembly are facing forward. Ensure that the handlebar clamping mechanism on the stem is tightened. Note, for some 12"(30cm) BMX bicycles the handlebar and stem is a one piece assembly and is tightened via a clamp fitted on top of the fork tube. (See inset diagram). After front wheel is fitted test the tightness by clamping the wheel between your knees and trying to twist the handlebars. (Please refer to "Steering Systems" pages 45-51 for more details.)



The handlebar must be inserted so that the minimum insertion mark cannot be seen.





3 . Seat

Insert the seat pillar into the seat clamp and tighten. Insert the seat/pillar assembly into the frame tube of the bicycle observing the minimum insertion mark on the pillar. Ensure the seat is level and facing the front. Tighten with a 13mm ring spanner. Turn the bicycle upside down and rest it on the seat and handlebars.



The seat pillar must be inserted so that the minimum insertion cannot be seen.



4 . Pedals

Attach the pedals carefully, engaging the thread initially by hand. Note that the right hand pedal attaches to the chainwheel side crank with a right hand (clockwise) thread. The left pedal attaches to the other crank arm and has a left hand (counter clockwise) thread. The ends of each pedal spindle are marked with either an 'R' for right or 'L' for left. Tighten pedals very firmly using a narrow 15mm open ended spanner. Note, damage will occur if pedals are not correctly and firmly attached.



Attachment of an incorrect pedal into a crank arm will cause irreparable damage.

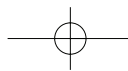


5 . Front Wheel and Mudguard

For bicycles where a front mudguard is supplied, this should be attached before fitting the front wheel. Position it with the short end facing forward and attach the metal bracket behind the 10mm nut fixed to the rear of the brake centre bolt.

Insert the front wheel into the forks. Where supplied ensure that the specially shaped washer, sometimes with a small tab, under the wheel nut under the wheel nut is located in the slot in the forks.

This tab will ensure that the wheel will not fall out should the nuts become loose. The mudguard stays are to be attached under the wheel axle nuts. Tighten the wheel nuts using the appropriate 14mm or 15mm spanner.



6 . Training Wheels

For 12"(30cm) and 16"(40cm) bicycles supplied with trainer wheels, each wheel must first be assembled onto the metal "L" brackets supplied, and then mounted to each side of the rear wheel. First, insert the axle bolts through each trainer wheel, followed by the washers. Next, insert each assembly into the "L" brackets and attach with the hexagonal nuts supplied.

Then, remove the 15mm rear axle nuts from the bicycle and fit the metal locating brackets onto the rear axle so that the tabs fit into the frame slot. Place the training wheel support arms over the locating brackets, refit and re-tighten the rear axle nuts. Note that the trainer wheels should be positioned so that they do not quite touch the ground when the bicycle is standing vertically.



7 . Front Brake

Brakes must be adjusted and firmly tightened so that the brake shoes are correctly aligned with the rim, and have minimal clearance with the rim before the control lever is squeezed. Your bike may be fitted with sidepull, 'V' style, or other types of brakes but the same adjustments must be made. Be sure that the right hand control lever operates the front brake, and for freewheel models with two handbrakes, the left lever operates the rear brake. To connect the front brake, position yourself so you can comfortably squeeze the brake calipers together with one hand while adjusting and fastening the brake cable with the other hand. If your bike is fitted with "sidepull" type brakes grasp and firmly squeeze the caliper with one hand so that the brake pads are touching the rim. Loosen the eyebolt holding the brake cable with a 10mm spanner, firmly pull the cable through the hole, and then re-tighten. To connect and adjust "V" style or "Linear Pull" type brakes, Allen key to set the brake shoes to within 2mm of, and parallel to, the rim with the brake arms

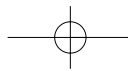
in a vertical position. Position the drum shaped end button of the control cable into the hand brake lever. Loosen the cable eyebolt on the left hand brake arm. Thread the cable through both brake arms, positioning the curved outer casing runner through the right arm, and the inner wire through the eyebolt on the left arm. Squeeze the brake arms together, pull the cable wire through the eyebolt, and tighten it. Adjust the brake pads and tighten with appropriate 10mm spanner or Allen key so they contact squarely with and are aligned parallel to the rim surface.

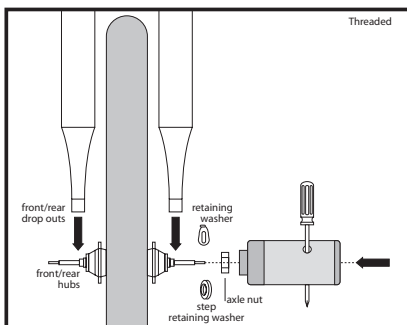
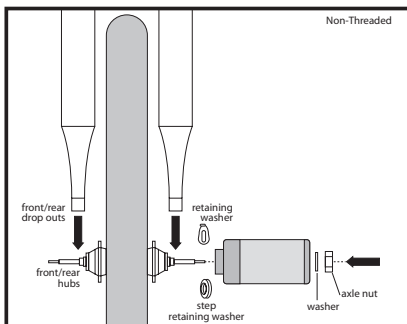
Firmly squeeze the control lever and check the brake pads are 1.5mm to 2mm away from the rim each side after lever is released. If clearance needs adjusting loosen the eyebolt, hold the brake arms in position so the pads just touch the rim, pull the cable tight, then re-tighten the eyebolt. Firmly squeeze the lever again and re-check clearance. Adjust again as above if clearance excessive, or fine tune by turning the cable adjusters at the lever. Ensure end cap is fitted to cable to prevent fraying. Connecting and adjusting rear brakes on freewheel models follows similar procedures as for the front. For more details refer to Brakes section under Detailed Maintenance further on in the manual.



Do not ride the bicycle until the brakes are functioning properly. Test the brakes by squeezing the brake control lever firmly and trying to push the bicycle forward.

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8 . Axle Peg Assembly Instructions

NON-THREADED

First remove the axle nut from the wheel. There will be either a retaining washer or a step retaining washer included. Place this washer between the peg and the frame of the bicycle. Slide the peg onto the axle followed by a flat washer and lastly the axle nut. Tighten the axle nut clockwise until the peg fits snugly against the frame or fork. Repeat for all the remaining pegs.

THREADED

This style of peg is threaded to fit the axle. Make sure the axle nut is tight with a 15mm wrench. Place a screw driver through the mounting holes of the peg and attach the peg to the axle by turning clockwise. Tighten against the frame or fork for a snug fit. repeat for all the remaining pegs



PLEASE NOTE Not all axles are able to accept pegs. Please consult our service department if you have any questions. Some BMX bicycles come with two or four pegs. If your bicycle is a dirt jumping style bicycle, you will receive only two pegs. These are designed for the front wheel. Freestyle bicycles come with four pegs, two for each wheel.

9 . Finally

For BMX bicycles attach the safety crash pads as shown. Check tyre pressure is inflated to the range recommendation on the tyre sidewalls. Attach the orange reflectors to the spokes of both wheels directly opposite the valve stem and within 76mm of the rim. Attach the white reflector to the front reflector bracket and the red reflector to the rear reflector bracket using an 8mm spanner or Phillips head screwdriver. Attach the bell to the left handlebar near the grip. Before riding ensure all nuts, bolts and fittings on the bicycle have been correctly tightened. Correct maintenance of your bicycle will ensure many years of happy riding. Service your bicycle regularly yourself by referring to the relevant sections of this manual OR take it to your specialist bicycle shop.

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CORRECT FRAME SIZE

When selecting a new bicycle the correct wheel and frame size is a very important safety consideration. A bicycle should never be purchased too big for the rider with the view that they will grow to fit it. This is especially important for kids as they need to gain confidence and the necessary co-ordination to control the bike safely. Kid's body and leg lengths vary a lot even in same age groups. Kid's bikes come in different wheel sizes and there are different frame styles, such as Y-Frames, to suit the rider's size. Most full sized gent's bicycles come in a range of frame sizes. These sizes usually refer to the distance between the centre of the bottom bracket and the top of the frame seat tube. For selection of a bicycle for children of short stature, the seat position must be adjustable so that the feet of a seated rider can reach the ground.

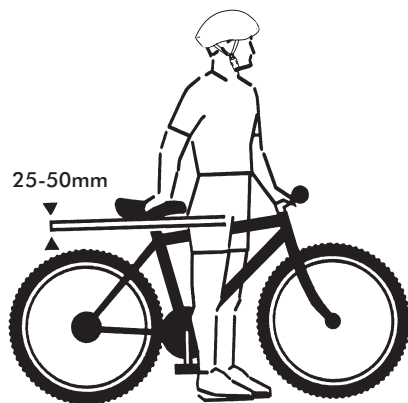


WARNING: If your bicycle does not match your size properly, you may lose control and fall, so ask your dealer to exchange it before you ride it. For safe and comfortable riding there should be a clearance of between 25mm and 50mm between the crotch of the intended rider and the top frame tube of the bicycle, while rider straddles the bicycle with both feet flat on the ground. Female riders should take into account the slope of the top tube to determine frame size suitability. If in doubt, ask your dealer.

The ideal clearance will vary between types of bicycles and rider preference. This makes straddling the frame when off the saddle easier and safer in situations such as sudden traffic stops.

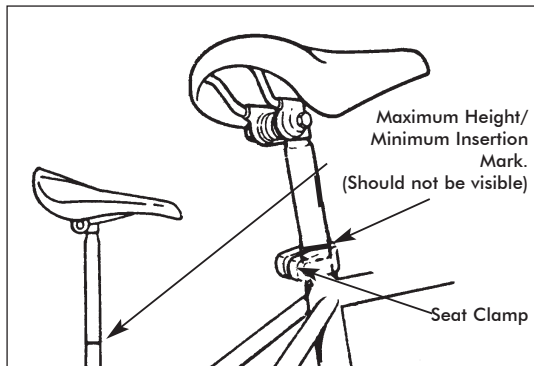
The correct sized female style bicycle can be checked using a male model as a guide.

The following chart and diagram will help you make the correct choice.



Bicycle Sizing Guide

Approx. rider inner leg length	Approx. Ages	Wheel Size (kid's models)	Suggested Frame Size for Road Bikes	Suggested Frame Size for Mountain or Hybrid Bikes
40cm min.	3-5	30cm(12")		
46cm min.	4-7	40cm(16")		
55cm min.	6-10	50cm(20")		
61cm min.	9-12	61cm(24")		
61-69cm	12 plus	-	-	37cm(14.5")
66-76cm	12 plus	-	-	43cm(17")
71-79cm	12 plus	-	50cm(19.5")	45cm(18")
76-84cm	12 plus	-	55cm(21.5")	50cm(19.5")
79-86cm	12 plus	-	57cm(22.5")	52cm(20.5")
81-89cm	12 plus	-	60cm(23.5")	53cm(21")-56cm(22")
86-94cm	12 plus	-	63cm(25")	58cm(23")-60cm(23.5")



RIDING POSITION

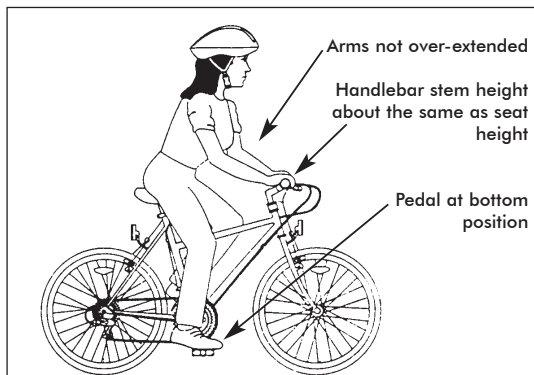
1 . Saddle Height

In order to obtain the most comfortable riding position, offering the best possible pedalling efficiency, the seat height should be set correctly in relation to the riders leg length. The correct saddle height should not allow leg strain from over-extension, and the hips should not rock from side to side while pedalling.

While sitting on the bicycle with one pedal at its lowest point, place the ball of your foot on that pedal. The correct saddle height will allow that knee to be slightly bent in this position. If the rider then places the heel of that foot on the pedal the leg should be almost straight.



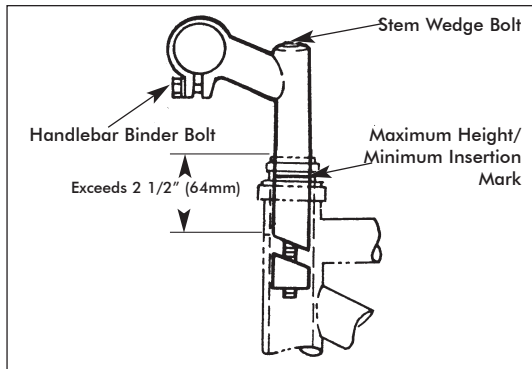
Ensure seat pillar does not extend beyond the minimum insertion mark. (Refer P. 52 on how to adjust seat height.) If your bicycle is fitted with a suspension type seat post, the same caution should be noted.



2 . Reach

To obtain maximum comfort the rider should not overextend his or her reach when riding. While placing your elbow against the seat and stretching out your arm, the distance between the outstretched fingertips and the handlebar should be 2cm-5cm.

To adjust this distance, the position of the seat can be altered in relation to the seat pillar. (Refer to Part 5 on how to adjust the seat clamp).



3 . Handlebar Height

Maximum comfort is usually obtained when the handlebar height is equal to the height of the seat. You may wish to try different heights to find the most comfortable position. Some bikes now come with adjustable handlebar stems to allow a customised comfort fit.



Ensure handlebar stem does not extend beyond the minimum insertion mark.
(Refer to Part 5 on how to adjust Handlebars).



CAUTION: On some bicycles, changing stem height can affect the tension of the front brake, locking the front brake or creating sufficient cable slack to make the front brake inoperable. If the front brake shoes move in towards the wheel rim or out away from the wheel rim when you change stem height, take your bicycle to your dealer for correct brake adjustment before riding it.



WARNING: Failure to properly tighten the stem binder bolt, the handlebar binder bolt or the bar end extension clamping bolts may compromise steering action, which could cause you to lose control and fall. Place the front wheel of the bicycle between your legs and attempt to twist the handlebar / stem assembly. If you can twist the stem in relation to the front wheel, turn the handlebars in relation to the stem, or turn the bar end extensions in relation to the handlebar, tighten the bolts.



If your bicycle is fitted with a suspension type handlebar stem, the same caution and warning should be noted.



SAFETY CHECKLIST

Before every ride it is important to carry out the following safety checks.

In addition to these, and the recommended maintenance in Parts 4 and 5 of this manual, every fortnight a thorough inspection should be carried out with all nuts and bolts tightened, worn and damaged parts replaced, and components properly positioned.

For further details please refer to the relevant sections in parts 4 and 5.



Be careful to keep body parts and other objects away from the sharp teeth of the chainrings; the moving chain; the turning pedals and cranks; and the spinning wheels of your bicycle.

Always wear shoes that will stay on your feet and will grip the pedals. Never ride barefoot or wearing sandals. Don't jump with your bike. Jumping a bike, particularly a BMX or Mountain Bike, can be fun; but it puts incredible stress on everything from your spokes to your pedals. Perhaps most vulnerable to jumping-related damage is your front fork.



1 . Brakes

- . ensure front and rear brakes work properly
- . ensure brake shoe pads are not over worn and are correctly positioned in relation to the rims
- . ensure brake control cables are lubricated, correctly adjusted, and display no obvious wear
- . ensure brake control levers are lubricated and tightly secured to the handlebar
- . where brake components are supplied with a separate manual, refer to this for further details



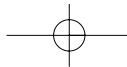
2 . Wheels and Tyres

- . ensure tyres are inflated to within the maximum recommended limit as displayed on the tyre sidewall
- . ensure tyres have tread and have no bulges or excessive wear
- . ensure rims run true and have no obvious buckles or kinks
- . ensure all wheel spokes are tight and not broken
- . check that axle nuts are tight. If your bicycle is fitted with quick release axles, make sure locking levers are correctly tensioned and in the closed position



3 . Saddle

- . ensure clamp underneath saddle is firmly tightened to the saddle post
- . ensure frame clamping mechanism is securely fastened
- . saddle pillar must be inserted so that the minimum mark cannot be seen



4 . Steering

- . ensure handlebar and stem are correctly adjusted and tightened and allow proper steering
- . ensure that the handlebars are set correctly in relation to the forks and the direction of travel
- . check that head set locking mechanism is properly adjusted and tightened
- . if the bicycle is fitted with handlebar end extensions, ensure they are properly positioned and tightened
- . handlebar stem must be inserted so that the minimum mark cannot be seen
- . the ends of the handlebars and bar ends must be covered or capped



5 . Chain

- . ensure chain is oiled, clean and runs smoothly
- . extra care is required in wet or dusty conditions



6 . Bearings

- . ensure all bearings are lubricated, run freely and display no excess movement, grinding or rattling
- . check Headset, Wheel Bearings, Pedal Bearings and Bottom Bracket Bearings



7 . Cranks and Pedals

- . ensure pedals are correctly and securely tightened to the cranks
- . ensure cranks are securely tightened to the axle and are not bent



8 . Derailleurs

- . check that front and rear mechanisms are adjusted and function properly
- . ensure control levers are securely attached
- . ensure derailleurs, shift levers and control cables are properly lubricated
- . where gear components are supplied with a separate manual, refer to this for specific details



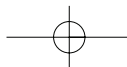
9 . Frame and Fork

- . check that the frame and fork are not bent or broken
- . if either are bent or broken they should be replaced



10 . Suspension

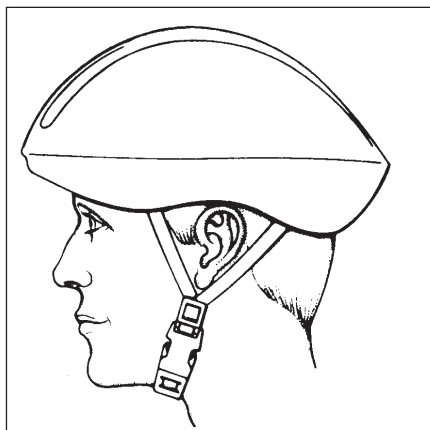
- . check that all components of fork and rear suspension (if fitted) are correctly tightened
- . check that there is no excessive wear or side play in rear suspension components
- . check that components function smoothly without binding
- . where suspension components are supplied with a separate manual, refer to this for more specific safety checks





11 . Accessories & Safety

- . ensure that the bell is functioning properly as a warning device
- . ensure that all reflectors are properly fitted and not obscured
- . if night riding, ensure dynamo or battery powered lights are fitted to the front and rear of the bicycle and are functioning properly
- . ensure all other fittings on the bike are properly and securely fastened and functioning
- . ensure the rider and a child seated in a safety seat are both wearing helmets



HELMETS

It is strongly advised that a properly fitting, Australian Standards Approved, bicycle safety helmet be worn at all times when riding your bicycle. In addition, if you are carrying a passenger in a child safety seat, they must also be wearing a helmet.

A bicycle helmet must:

- . be labelled with the Australian & New Zealand Standards approved mark AS/NZS 2063
- . fit correctly

The right helmet should:

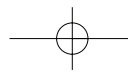
- . be comfortable
- . be lightweight
- . have good ventilation.



In most Australian states the wearing of helmets is compulsory with enforceable penalties.



All fitting adjustments should be carried out prior to starting your ride and any re-adjustments should be made while stationary.

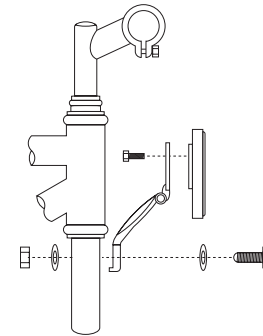


12 . Reflectors

Your bicycle is supplied with one front (white), one rear (red), two wheel (orange), and four pedal (orange) reflectors. (Please note: Sidewalk bikes, 12" and under, may not have reflectors). These are an important safety and legal requirement, and should remain securely fitted and in good, clean condition at all times. Periodically, inspect all reflector, brackets and mounting hardware for signs of wear or damage. Replace immediately if damage is found. Some bicycles will require you to install reflectors onto your bicycle. Please refer to the following section for instructions on all types of bicycle reflectors.

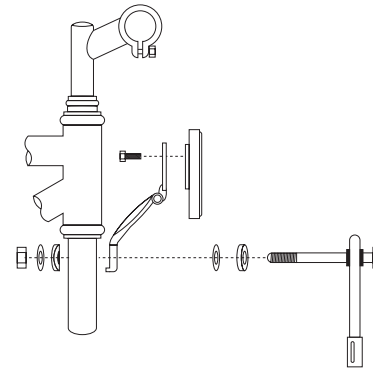
Fork Mount Reflector Bracket Assembly

First insert one washer onto the hex bolt and insert hex bolt through the reflector bracket and then through the fork. Next insert a second washer onto the bolt and thread a hex nut onto the bolt behind the fork. Tighten bolts until snug, making sure the reflector is in an upright position. See diagram at the right.



Front Reflector Mount with Caliper Brake Assembly

First remove the hex nut from the back of the fork and pull the brake from the fork. Insert a spacer, washer and the reflector bracket on to the caliper bolt. Insert the caliper bolt back into the fork and secure firmly with a concave spacer, washer and the hex nut. Finally, adjust the reflector such that it is in an upright position. See diagram at the right.

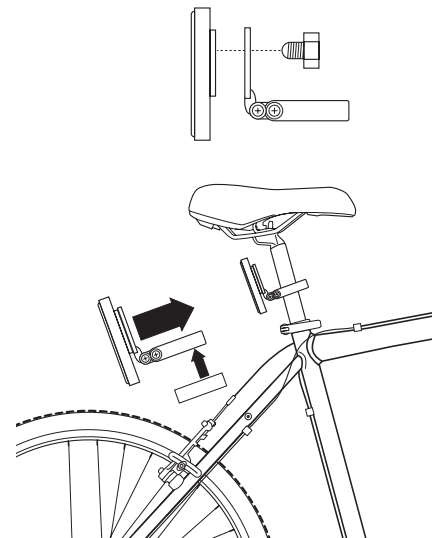




12 . Reflectors (Cont)

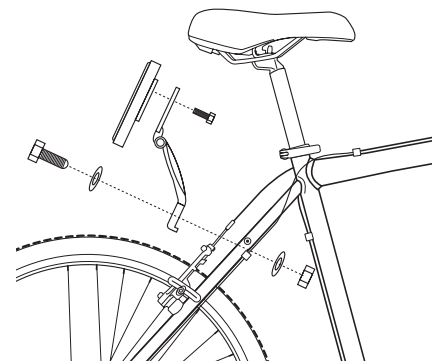
Seat and Handlebar Mounting Reflectors

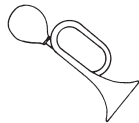
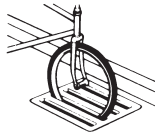
First attach the reflector to the reflector bracket with the reflector screw, see the top diagram. Next, remove the clamp screw and open the clamping reflector bracket. Place clamping reflector bracket around the handlebar or seat post. If the clamp is too loose, insert the shim inside of the clamp. Tighten the clamp screw to hold reflector assembly in place, see the second diagram. Finally, adjust the reflector assembly in place and ensure that it is upright and facing away from the bike.



Seatstay Mount reflector Bracket Assembly

First insert one washer onto the hex bolt and insert hex bolt through the reflector bracket and then through the seatstay bridge. Next, insert a second washer onto the bolt and thread a hex nut onto the bolt behind the seatstay bridge. Tighten bolts until snug, making sure the reflector is in an upright position. See diagram at the right.





RIDING SAFELY

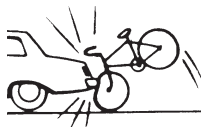
General Rules

- . When riding obey the same road laws as all other road vehicles, including giving way to pedestrians, and stopping at red lights and stop signs.
- . For further information contact the Road Traffic Authority in your State.
- . Ride predictably and in a straight line on the left side of the road. Never ride against the traffic.
- . Use correct hand signals to indicate turning or stopping.
- . Ride defensively. To other road users you may be hard to see.
- . Concentrate on the path ahead. Avoid pot holes, gravel, wet road markings, oil, curbs, speed bumps, drain grates and other obstacles.
- . Cross tram and train tracks at a 90 degree angle or walk your bicycle across.
- . Expect the unexpected such as opening car doors or cars backing out of concealed driveways.
- . Use your bell as a warning.
- . Be extra careful at intersections and when preparing to pass other vehicles.
- . Familiarise yourself with all the bicycle's features. Practice gear shifts, braking and the use of toe clips and straps, if fitted.
- . If you are wearing loose trousers, use leg clips or elastic bands to prevent them being caught in the chain.
- . Don't carry packages or passengers that will interfere with your visibility or control of the bicycle.
- . Don't use items that may restrict your hearing.
- . When braking, always apply the rear brake first, then the front. The front brake is more powerful and if it is not correctly applied you may lose control and fall.
- . Maintain a comfortable stopping distance from all other riders, vehicles and objects.
Safe braking distances and forces are subject to the prevailing weather conditions.



Wet Weather

- . In wet weather you need to take extra care.
- . Brake earlier, you will take a longer distance to stop.
- . Decrease your riding speed, avoid sudden braking and take corners with additional caution.
- . Be more visible on the road - wear reflective clothing and use safety lights.
- . Pot holes and slippery surfaces such as line markings and tram tracks all become more hazardous in the wet.



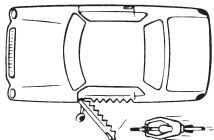
Night Riding

- . Ensure bicycle is equipped with a full set of correctly positioned and clean reflectors
- . Refer to Part 5 of this manual.



Never venture on roads at night without functioning front and rear bicycle lights.
In most Australian States the use of bicycle lights is compulsory when riding after dark.

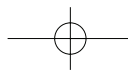
- . Use a properly functioning lighting set comprising a white front lamp and a red rear lamp.
- . If using battery powered lights make sure batteries are well charged. If using dynamo powered lights ensure wiring is properly connected and not loosely fitted.
- . Some rear lights available have a flashing mechanism which enhances visibility.
- . Wear reflective and light coloured clothing.
- . Ride at night only if necessary. Slow down and use familiar roads with street lighting if possible.



Pedalling Technique

- . Position the ball of your foot on the centre of the pedal.
- . When pedalling, ensure your knees are parallel to the bicycle frame.
- . To absorb shock, keep your elbows slightly bent.
- . Learn to operate the gears properly (Refer to Pages 28-31 in this part of the manual).





Hill Technique

- . gear down before a climb and continue gearing down as required to maintain pedalling speed
- . if you reach the lowest gear and are struggling, stand up on your pedals. You will then obtain more power from each pedal revolution
- . on the descent, use the high gears to avoid rapid pedalling
- . do not exceed a comfortable speed, maintain control and take additional care



WARNING: Downhill mountain biking can lead to serious accidents. Wear appropriate safety gear and be sure your bike is in perfect condition. Follow all instructions above.

Cornering Technique

Brake slightly before cornering and prepare to lean your body into the corner. Maintain the inside pedal at the 12 o'clock position and slightly point the inside knee in the direction you are turning. Keep the other leg straight, don't pedal through fast or tight corners.

Rules for Children

To avoid accidents, teach children good riding skills with an emphasis on safety from an early age.

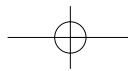
- 1 . Always wear a properly fitting helmet
- 2 . Do not play on driveways or the road
- 3 . Do not ride on busy streets
- 4 . Do not ride at night
- 5 . Obey all the traffic laws, especially stop signs and red lights
- 6 . Be aware of other road vehicles behind and nearby
- 7 . Before entering a street: Stop. Look right, left, and right again for traffic
If there's no traffic, proceed into the roadway
- 8 . If riding downhill be extra careful. Slow down using the brakes and maintain control of the steering

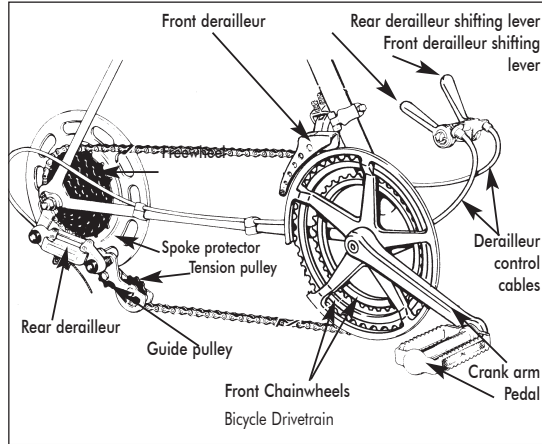
The Consumer Affairs Department advises that the riding of small wheel diameter bicycles at excessive speeds can lead to instability and is not recommended.



Never take your hands off the handlebars, or your feet off the pedals when riding downhill.

Children should be made aware of all possible riding hazards and correct riding behaviour before they take to the streets
- don't leave it up to trial and error.





GEARS . HOW TO OPERATE

Derailleur Gears

Most multispeed bicycles today are equipped with what are known as derailleur gears.

They operate using a system of levers and mechanisms to move the drive chain between different sized driving gears or cogs.

The purpose of gears is to let you maintain a constant, steady pedalling pace under varying conditions. This means your riding will be less tiring without unnecessary straining up hills or fast pedalling down hill.

Bicycles come with a variety of gear configurations from 5 through to 27 speed. A 5-6 speed bicycle will have a single front chainwheel, a rear derailleur only and 5 or 6 cogs on the rear hub. Bicycles with more gears will also have a front derailleur, a front chainwheel with 2-3 cogs and up to 9 cogs on the rear hub.

Operating Principles

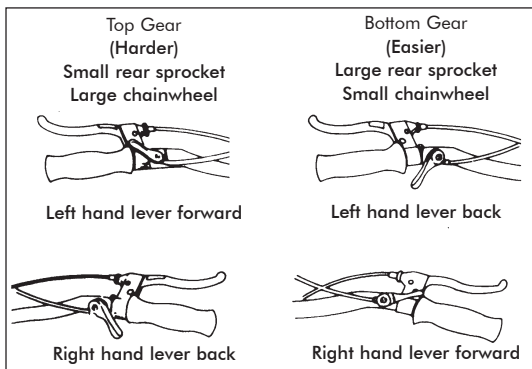
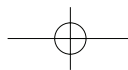
No matter how many gears, the operating principles are the same.

The front derailleur is operated by the left shift lever and the rear derailleur by the right. To operate you must be pedalling forward.

You can not shift derailleur gears when you are stopped or when pedalling backwards. Before shifting ease up on your pedalling pressure. On approaching a hill, shift to a lower gear before your pedalling speed slows down too much for a smooth shift. When coming to a stop, shift to a lower gear first so it will be easier when you start riding again.

If, after selecting a new gear position, you hear a slight rubbing noise from the front or rear gears, gently adjust the appropriate shifter until the noise goes away.

To avoid rapid chain wear it is recommended that you avoid using the extreme combinations of gear positions shown in the diagrams. Refer p.31

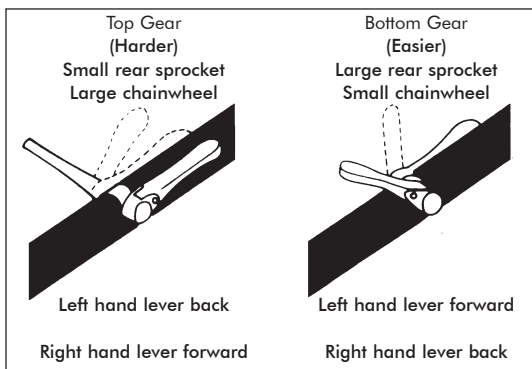


Thumb Shifters (Top Mounted)

Most MTB style bicycles are equipped with shifters mounted on the top of the handlebars and operated by the thumbs.

To select a lower, easier gear, shift to a bigger rear cog and a small chainwheel. Pull the left shifter back to operate the front derailleur, and push the right shifter forward to operate the rear derailleur.

To select a higher, harder gear, shift to a smaller rear cog and a larger chainwheel. Push the left shifter forward for the front, and pull the right lever back for the rear.

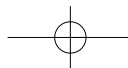


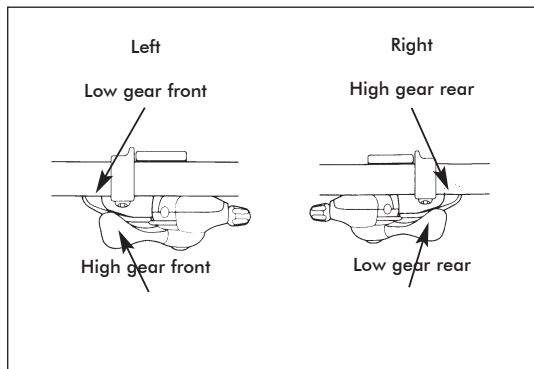
Down Tube and Handlebar Stem Shifters

Racing style and touring model bicycles usually have the gear shifters mounted either on the handlebar stem or toward the top of the frame down tube.

To select a lower gear, push the left shifter forward to engage a smaller front chainwheel, and pull the right shifter back to engage a larger rear cog.

To select a higher gear, pull the left lever back to engage a larger chain wheel, and push the right lever forward to engage a smaller rear sprocket.



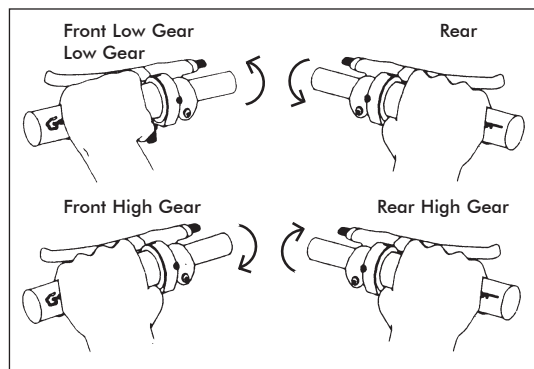


Below the Bar Shifters

Many of today's more upmarket Mountain style bicycles now use a shift lever arrangement mounted on the underside of the handlebars, which uses two levers operated by the thumb and index finger.

To select a lower gear push the larger (lower) right shifter with your thumb to engage a larger rear cog. One firm push shifts the chain one cog, continuing to push will move the chain over multiple cogs. Pushing the smaller (upper) left shifter with your index finger moves the chain from a larger to a smaller chainwheel.

To select a higher gear push the smaller (upper) right lever with your index finger to engage a smaller rear cog. Pushing the larger (lower) left lever with your thumb will move the chain from a smaller to a larger chainwheel.



Hand Grip Shifters

Some bicycles are now being equipped with a shifting mechanism, called Grip Shift™, which is built into the handlebar grips and does not make use of separate levers.

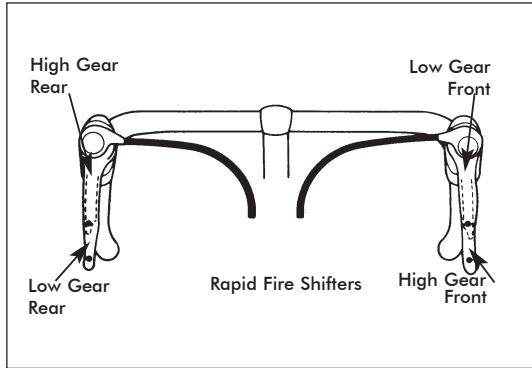
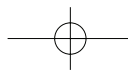
The actuating mechanism is built into the inside part of the grip that the web of the thumb and index finger closes around.

To select a lower gear, twist the right shifter toward you to engage a larger rear cog.

You can shift one gear at a time by moving the Grip Shift™ one click, or through multiple gears by continued twisting. By twisting the left shifter forward or away from you a smaller chainwheel can be selected.

To select a higher gear, twist the right shifter forward or away from you to engage a smaller rear cog. To engage a larger front chainwheel, twist the left shifter towards you.

Single shifts can be achieved by twisting one click at a time and multiple shifts by larger twists.

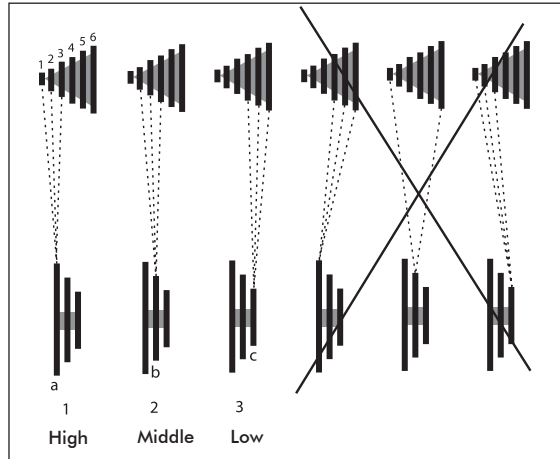


Dual Control Shifters

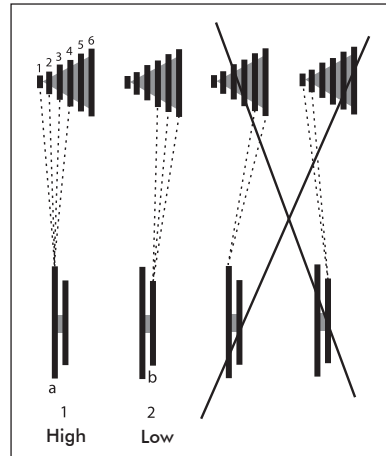
Some "top of the range" racing bicycles now use dual control levers. These actuate both the brakes, like a conventional brake lever, and also the gears, when moved inward toward the front wheel. This allows gear shifting without the need to take your hands off the handlebar bends or brake drop levers.

To select a lower gear move the large right lever inward to engage a larger rear cog. One firm push shifts the chain one cog, continuing to push will move the chain over multiple cogs. Pushing the small left lever lightly will move the front derailleur a small amount to eliminate noise, pushing again will engage a smaller chainwheel.

To select a higher gear, push the small right lever to engage a smaller rear cog. By pushing the large left lever inwards a larger front chainwheel will be engaged.



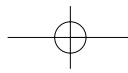
Recommended Chainwheel/Rear Sprocket Gear Combinations



CAUTION: Never move the shifter while pedalling forward, nor pedal backwards after having moved the shifter. This could jam the chain and cause serious damage to the bike.



WARNING: Never shift a mal-adjusted derailleur onto the largest or the smallest sprocket. The chain could jam, causing you to lose control and fall.





BICYCLE CARE

Basic Maintenance

The following procedures will ensure your bicycle is maintained in top condition.

For painted frames, dust the surface and remove any loose dirt with a dry cloth. To clean, wipe with a damp cloth soaked in a mild detergent mixture. Dry with a cloth and polish with car or furniture wax. Use soap and water to clean plastic parts and rubber tyres. Chrome plated bikes should be wiped over with a rust preventative fluid.

Store your bicycle under shelter. Avoid leaving it in the rain or exposed to corrosive materials.

Riding on the beach or in coastal areas exposes your bicycle to salt, which is very corrosive. Wash your bicycle frequently and wipe or spray all unpainted parts with an anti-rust treatment. Make sure wheel rims are dry so braking performance is not affected. After rain, dry your bicycle and apply anti-rust treatment.

If the hub and bottom bracket bearings of your bicycle have been submerged in water, they should be taken out and re-greased. This will prevent accelerated bearing deterioration.

If paint has become scratched or chipped to the metal, use touch up paint to prevent rust.

Clear nail varnish can also be used as a preventative measure.

Regularly clean and lubricate all moving parts, tighten components and make adjustments as required.

(Refer to Parts 4 and 5 of this manual for further details).

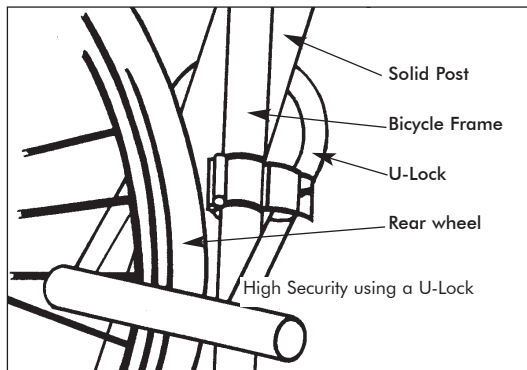
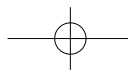
The use of alloy components and B.E.D. (black electronic deposit) treated steel rims minimises the number of places where rust can surface.

Storage

Keep your bicycle in a dry location away from the weather and the sun. Ultra violet rays may cause paint fading or cracking to rubber and plastic parts.

Before storing your bicycle for a long period of time, clean and lubricate it and wax the frame. Deflate the tyres to half pressure and hang the bicycle off the ground. Don't store near electric motors as ozone emissions may effect the rubber and paint.

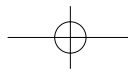
Don't cover with plastic as "sweating" will result, which may cause rusting.



Security

It is advisable that the following steps be taken to prepare for and help prevent possible theft.

- 1 . Maintain a record of the bicycle serial number, generally located on the frame underneath the bottom bracket.
- 2 . Register the bicycle with the manufacturer/distributor and local police.
- 3 . Invest in a high quality bicycle lock that will resist hack saws and bolt cutters. Always lock your bicycle to an immovable object, such as a lamp post, if it is left unattended.





Correct routine maintenance of your new bike will ensure:

. Smooth running . Longer lasting components . Safer riding . Lower running costs
Every time you ride your bicycle it's condition changes. The more you ride, the more frequently maintenance will be required. We recommend you spend a little time on regular maintenance tasks. The following schedules are a useful guide and, by referring to Part 5 of this manual, you should be able to accomplish most tasks. If you require assistance we recommend you see your specialist bicycle dealer.

Schedule 1 . Lubrication

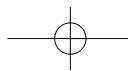
Frequency	Component	Lubricant	How to lubricate
Weekly	chain	chain lube or light oil	brush on or squirt
	deraileur wheels	chain lube or light oil	brush on or squirt
	deraillleurs	oil	oil can
	brake calipers	oil	3 drops from oil can
Monthly	brake levers	oil	2 drops from oil can
	shift levers	lithium based grease	disassemble
	brake cable ends	oil	1 drop from oil can
6 Monthly	hubs	lithium based grease	disassemble
	bottom bracket	lithium based grease	disassemble
	pedals	lithium based grease	disassemble
	freewheel	oil	2 squirts from oil can
	brake cables	lithium based grease	disassemble
	derailleur cables	lithium based grease	disassemble
Yearly	wheel bearings	lithium based grease	disassemble
	headset	lithium based grease	disassemble
	seat pillar	lithium based grease	disassemble

Note: The frequency of maintenance should increase with lots of usage and use in wet or dusty conditions.

Do not over lubricate - remove excess lubricant to prevent dirt build up.



WARNING: Many bicycle service and repair tasks require special knowledge and tools. Do not begin any adjustments or service on your bicycle if you have the slightest doubt about your ability to properly complete them. Improper adjustment or service can result in damage to the bicycle or in an accident which can cause serious injury or death. Ask your dealer for advice. We recommend that significant mechanical repairs be carried out by a skilled bicycle mechanic.

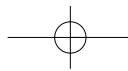


Schedule 2 . Service Checklist

Frequency	Task	Page Reference	
Before every ride	Check tyre pressure	38	
	Check brake operation	53	
	Check wheels for loose spokes	37	
	Make sure nothing is loose	36	
After every ride	Quick wipe down with damp cloth	32	
Weekly	Lubrication as per schedule 1	34	
Monthly	Lubrication as per schedule 1	34	
	Check derailleur adjustment	72	
	Check brake adjustment	53	
	Check brake and gear cable adjustment	53, 71	
	Check tyre wear and pressure	38	
	Check wheels are true and spokes tight	37	
	Check hub, head set and crank bearings for looseness	42, 48, 64	
	Check pedals are tight	61	
	Check handlebars are tight	46	
	Check seat and seat post are tight and comfortably adjusted	51	
	Check frame and fork for trueness	45	
	Check all nuts and bolts are tight	36	
	6 Monthly	Lubrication as per schedule 1	34
		Check all points as per Monthly service	35
Check and replace brake pads if required		60	
Yearly	Check chain for excess play or wear	68	
	Lubrication as per schedule 1	34	



WARNING: Like any mechanical device, a bicycle and its components are subject to wear and stress. Different materials and mechanisms wear or fatigue from stress at different rates and have different life cycles. If a component's life cycle is exceeded, the component can suddenly and catastrophically fail, causing serious injury or death to the rider. Scratches, cracks and discolouration are signs of a stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.





Torque Requirements

When performing routine adjustments on nuts and bolts it is recommended that a torque wrench be used to prevent overtightening and damage to the threads. The following are key components that should be tightened using a torque wrench.

Component

- Front axle nuts
- Rear axle nuts
- Handlebar clamp nut
- Head stem expander bolt
- Seat clamp nuts
- Seat post binder nut
- Brake cable fixing nut
- Brake caliper centre bolt nut
- Crank attachment systems

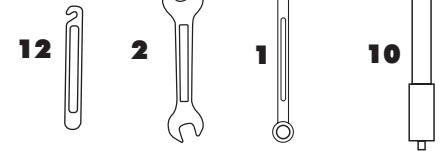
Torque

- 22 - 27 Newton Metres
- 24 - 29 Newton Metres
- 17 - 19 Newton Metres
- 17 - 19 Newton Metres
- 18 - 25 Newton Metres
- 15 - 19 Newton Metres
- 7 - 11 Newton Metres
- 5 - 10 Newton Metres
- 12 - 14 Newton Metres
(or as recommended by manufacturer)

Road/Racing Bicycles

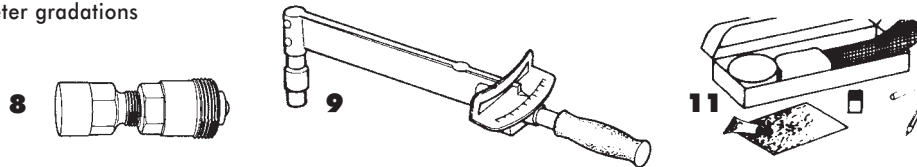
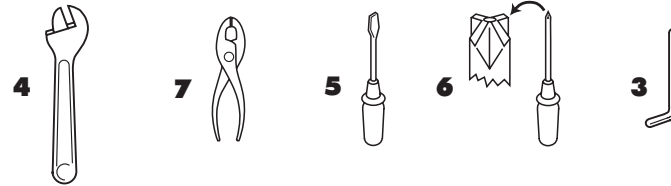
8-10 Newton Metres

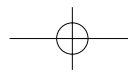
8-10 Newton Metres



Tools Required

- 1 . Open ended or ring spanners: 8mm, 9mm, 10mm, 12mm, 13mm, 14mm, 15mm
- 2 . Open end or pedal spanner 15mm
- 3 . Allen key wrenches: 4mm, 5mm, 6mm
- 4 . Adjustable wrench
- 5 . Standard flat head screwdriver
- 6 . Standard Phillips head screwdriver
- 7 . Standard slip joint pliers
- 8 . Crank remover
- 9 . Torque wrench with Newton Meter gradations
- 10 . Tyre pump
- 11 . Tube repair kit
- 12 . Tyre levers



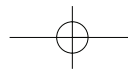


WHEELS AND TYRES

Wheel Inspection

It is most important that wheels are kept in top condition. Properly maintaining your bicycle's wheels will help braking performance and stability when riding. Be aware of the following potential problems:

- . Dirty or greasy rims: **Caution:** These can render your brakes ineffective. Do not clean them with oily or greasy materials. When cleaning, use a clean rag or wash with soapy water, rinse and air dry. Don't ride while they're wet. When lubricating your bicycle, don't get oil on the rim braking surfaces.
- . Wheels not straight: Lift each wheel off the ground and spin them to see if they are crooked or out of round. If wheels are not straight they will need to be adjusted. This is quite difficult and is best left to a specialist bicycle store.
- . Broken or loose spokes: Check that all spokes are tight and that none are missing or damaged.
Caution: Such damage can result in severe instability and possibly a crash if not corrected. Again, spoke repairs are best handled by a specialist.
- . Loose hub bearings: Lift each wheel off the ground and try to move the wheel from side to side.
Caution: If there is movement between the axle and the hub, do not ride the bicycle. Adjustment will be required.
- . Axle nuts: Check that these are tight before each ride. In addition, check that the front wheel secondary retention device is properly positioned if fitted. These devices help keep the wheel in place if axle nuts become loose.
Caution: Secondary retention devices should always remain properly fitted.
- . Quick release (QR): Check that these are set to the closed position and are properly tensioned before each ride.
Caution: Maintain the closed position and the correct adjustment. Failure to do so may result in serious injury.





Tyre Inspection

Tyres must be maintained properly to ensure road holding and stability. Check the following areas:

- . Inflation: Ensure tyres are inflated to the pressure indicated on the tyre sidewalls. It is better to use a tyre gauge and a hand pump than a service station pump.

Caution: If inflating tyres with a service station pump, take care that sudden over inflation does not cause a blow out.

- . Bead seating: When inflating or refitting tyres make sure that the bead is properly seated in the rim.

- . Tread: Check that the tread shows no signs of excessive wear or flat spots, and that there are no cuts or other damage.

Caution: Excessively worn or damaged tyres should be replaced.

- . Valves: Make sure valve caps are fitted and that valves are free from dirt. A slow leak caused by the entry of dirt can lead to a flat tyre, and possibly a dangerous situation.

Recommended tyre pressures

The recommended pressures moulded on the sidewall of your bicycle tyres will approximately match the following chart. Use this chart as a guide only. Actual pressure recommendations will vary widely depending on the manufacturer and the quality of the tyre. Tyres will require different inflation pressures depending on the type of wheel rim they are fitted to and on the kind of surface to be ridden over.

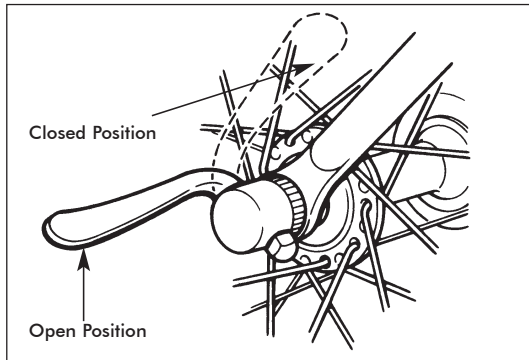
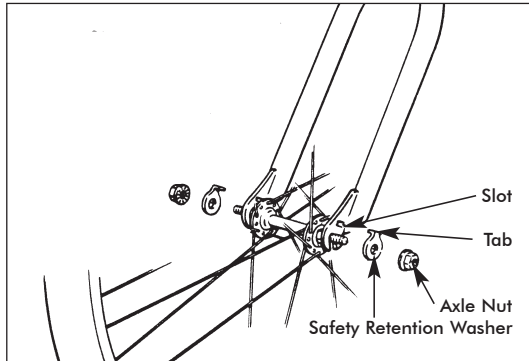
Always follow the tyre inflation pressure instructions which are written on the tyre sidewalls.

BMX (30cm/12", 40cm/16", 50cm/20" models)	240 - 344 KPa	(35-50 psi)
MTB (50cm/20", 61cm/24", 66cm/26" models)	240 - 380 KPa	(35-55 psi)
Road Touring (69cm/27", 700C models)	483 - 620 KPa	(70-90 psi)
Road Racing (700C)	755 - 862 KPa	(110-125 psi)
Hybrid / Crossbike (700C)	414 - 690 KPa	(60-100 psi)

Tyre pressure written on the sidewall may be given either as a maximum pressure or as a pressure range. How a tyre performs under different terrain or weather conditions depends largely on tyre pressure. Inflating a tyre to near its maximum recommended pressure gives the lowest rolling resistance, allowing a faster ride, but also results in a harsher ride. High pressures work best on smooth, dry pavement. Very low pressures, at the bottom of the recommended pressure range, give a softer ride on smooth, slick terrain such as hard packed clay, and improved grip on deep, loose surfaces such as deep, dry sand. Riding on tyres with pressures too low for your weight, surface conditions or the sidewall recommendations can increase chances of punctures by allowing the tyre to deform sufficiently to pinch the inner tube between the rim and the riding surface.



CAUTION: Pencil type automotive tyre gauges and service station air hose pressure settings are generally inaccurate and should not be depended on for consistent, accurate pressure. Instead, use a good quality dial gauge.



Front Wheel Removal

- 1 . Open the brake quick release, if fitted, or screw in the brake cable adjuster. If more clearance is needed you may need to undo the brake cable anchor bolt.
- 2 . If wheel is fitted with standard axle nuts, use a spanner to loosen them off. If secondary retention devices are fitted you will need to loosen the nuts sufficiently to allow clearance to remove the wheel.
- 3 . If a quick release axle is fitted, move the lever to the open position. If secondary retention devices are fitted, loosen the adjusting nut at the opposite end to the QR lever enough to allow the wheel to be removed.
- 4 . Remove the wheel.

Front Wheel Replacement

- 1 . Open the brake quick release, if fitted, or screw in the brake cable adjuster. If more clearance is needed you may need to undo the brake cable anchor bolt.
- 2 . Place the wheel into the frame ensuring that the axle fits well up against the fork end slots. You may need to slightly prise apart the fork legs.
- 3 . If the wheel has a QR axle, ensure the quick release lever is open and on the left side of the bicycle. Check that the QR tension is correct and close the lever so that it is parallel to the fork. This position will prevent accidental opening when riding.
- 4 . If secondary retention devices are fitted, make sure they are correctly located in the fork ends.
- 5 . Tighten both axle nuts firmly, if fitted.
- 6 . Re-set the brake quick-release and check the brake pad clearance. Adjust the brake cable / pad clearance if necessary.

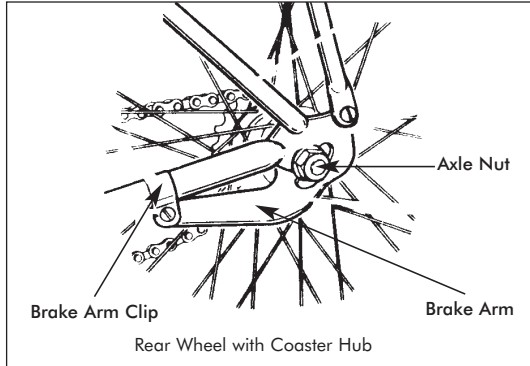


WARNING: Removing or disabling the secondary retention device is extremely dangerous and may lead to serious injury or death. It may also void the warranty.

CAUTION: If you can fully close the quick release without wrapping your fingers around the fork blade for leverage, and the lever does not leave a clear imprint in the palm of your hand, the tension is insufficient. Open the lever; turn the tension adjusting nut clockwise a quarter turn; then try again.

WARNING: Secondary retention devices are not a substitute for correct quick release adjustment. Failure to properly adjust the quick release mechanism can cause the wheel to wobble or disengage, which could cause you to lose control and fall, resulting in serious injury or death.





Rear Wheel Removal

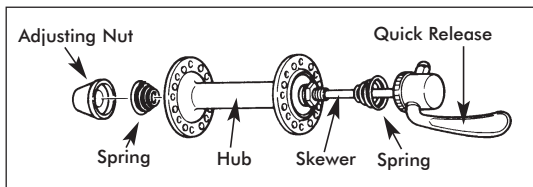
- 1 . Open the brake quick release, if fitted, or screw in the brake cable adjuster. If more clearance is needed you may need to undo the brake cable anchor bolt.
- 2 . If bicycle has derailleur gears, engage the chain onto the smallest rear cog.
- 3 . If wheel is fitted with standard axle nuts, use a spanner to loosen them off.
- 4 . If a quick release axle is fitted, move the lever to the open position.
- 5 . If the bicycle has derailleur gears, hold the derailleur unit to prevent it springing forward, and allow the wheel to slide forward and out of the frame.
- 6 . Rest the bike upside down on the handlebars and saddle.
- 7 . For single geared bicycles with coaster hub, remove the brake arm clip from the brake arm, lift the chain off the rear cog and over the rear axle by hand, then allow the wheel to slip out of the frame.

Rear Wheel Replacement

- 1 . Replacement follows almost the reverse sequence to removal.
- 2 . For derailleur geared bicycles, take up the tension in the rear derailleur spring by holding the unit fully back. Feed the top part of the smallest hub cog into the top part of the chain, and fit the wheel into the frame.
- 3 . For single geared bicycles, lift the chain over the axle and onto the cog, and fit the wheel into the frame.
- 4 . Make sure the wheel is properly centred in the frame by checking the distance between the front of the wheel and the frame chainstay tubes on either side. Firmly tighten both axle nuts.
- 5 . If the wheel has a QR axle, ensure the quick release lever is open and on the left side of the bicycle. Check that the QR tension is correct and close the lever so that it is parallel to the frame seat stay tube. This position is best to prevent accidental opening while riding.
- 6 . On coaster hub bicycles, reinstall the brake arm to the brake arm clip on the chainstay.
- 7 . Reset the brake quick-release and check the brake pad clearance. Adjust the brake cable / pad clearance if necessary.-

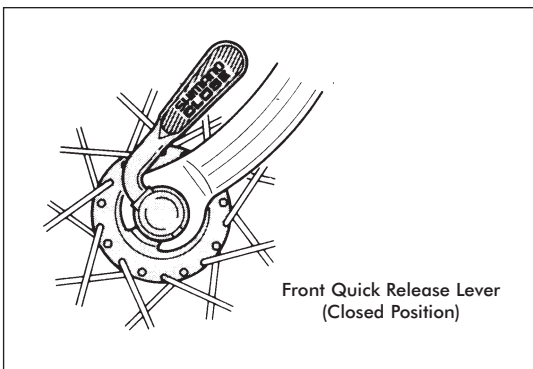
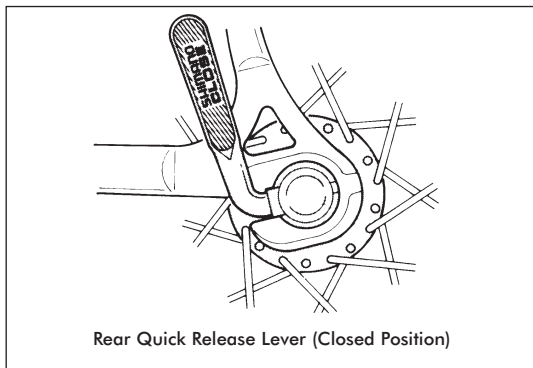


Failure to properly refit a rear wheel may result in a serious accident.



Correct QR Axle Setting

Some bicycles have wheel axles that incorporate a Quick Release (QR) mechanism. This allows easy wheel removal without the need for tools. The mechanism uses a long bolt with an adjusting nut on one end, and a lever operating a cam-action tensioner on the other.



Correct adjustment of the QR is vitally important to avoid an accident caused by loose wheels.

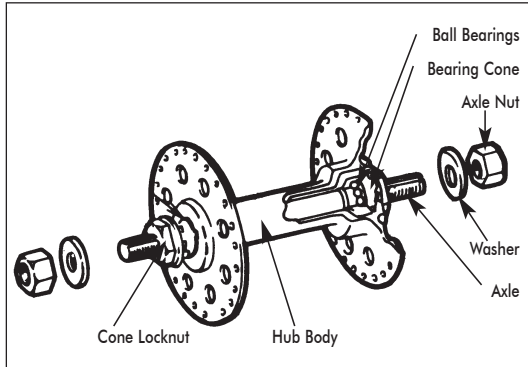


WARNING: Riding with an improperly adjusted wheel quick release can allow the wheel to wobble or disengage from the bicycle, causing damage to the bicycle, and serious injury or death to the rider. Therefore:

1. Ask your dealer to help you make sure you know how to install and remove your wheels safely.
2. Understand and apply the correct technique for clamping your wheel in place with a quick release.
3. Each time, before your ride, check that the wheel is securely clamped.

1. To set, turn the lever to the open position so that the curved part faces away from the bicycle.
2. While holding the lever in one hand, tighten the adjusting nut by hand until it stops.
3. Pivot the lever towards the closed position. When the lever is halfway closed, there must be firm resistance to turning it beyond that point.
If resistance is not firm, then further tighten the adjusting nut in a clockwise direction.
4. Continue to pivot the lever all the way to the closed position so that the curved part of the lever faces the bicycle.
5. The wheel is tightly secured when the serrated surfaces of the QR clamping parts actually begin to cut into the bicycle frame/fork surfaces.
6. Note that the same procedure applies when operating a QR seat post binder mechanism.





Hub Bearing Adjustment

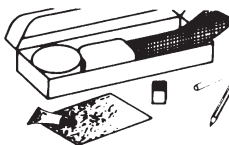
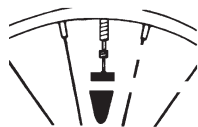
When checked, the hub bearings of either wheel will require adjustment if there is any more than slight side play.

- 1 . To adjust, remove wheel from bicycle and loosen the locknut on one side of the hub while holding the adjusting cone on the same side with a flat open end spanner.
- 2 . Rotate the adjusting cone as needed to eliminate free play.
- 3 . Re-tighten the locknut while holding the adjusting cone in position.
- 4 . Re-check that the wheel can turn freely without excessive side play.

Hub Lubrication

Wheel bearings should be disassembled and re-greased at least once a year. More frequent overhauls will be required if the bicycle has been used in very wet or muddy conditions. Disassembly requires some expertise which you may wish to refer to a specialist, but the following will help you if you wish to attempt this yourself:

- 1 . Remove the wheel from the frame.
- 2 . Remove the axle nut, cone lock nut, and the bearing cone from one side of the hub axle.
- 3 . Remove the axle, complete with cone and locknut, from the other side of the hub.
- 4 . Carefully remove the dust caps, if fitted, from both sides of the hub to expose the ball bearings.
- 5 . Carefully remove the loose ball bearings or ball retainers, if fitted, from both sides of the hub.
- 6 . On rear hubs with screw on type freewheels, you may need to remove the freewheel before disassembling the axle.
This requires a special tool.
- 7 . Thoroughly clean, and inspect for damage, all the hub parts. Check for damaged ball bearings and pits or grazes in the bearing surfaces. Replace if necessary.
- 8 . Pack grease into each clean or new ball retainer and into the inner cups of the hub, and refit.
- 9 . Re-assemble the hub axle in reverse sequence to disassembling, ensuring the bearing cones are carefully re-adjusted.



How To Fix a Flat Tyre

If you need to repair a tyre follow these steps:

- 1 . Remove the wheel from the bicycle.
- 2 . Deflate the tyre completely via the valve.
- 3 . Loosen the tyre bead by pushing it inwards all the way round the rim.
- 4 . Prise one side of the tyre bead up over the edge of the rim.
Note: Use tyre levers, not a screwdriver, otherwise you may damage the rim.
- 5 . Remove the tube, leaving the tyre on the rim.
- 6 . Locate the leaks and patch using a tube repair kit, carefully following the instructions, or replace the tube.
Note: Ensure the replacement tube size matches the size stated on the tyre sidewall and the valve is the correct type for your bicycle.
- 7 . Match the position of the leak in the tube with the tyre to locate the possible cause and mark the location on the tyre.
- 8 . Remove the tyre completely and inspect for a nail, glass etc. and remove if located.
Also inspect the inside of the rim to ensure there are no projecting spokes, rust or other potential causes.
Replace the rim tape, which covers the spoke ends, if damaged.
- 9 . Remount one side of the tyre onto the rim.
- 10 . Using a hand pump, inflate the tube just enough to give it some shape.
- 11 . Place the valve stem through the hole in the rim and work the tube into the tyre. **Note:** Do not let it twist.
- 12 . Using your hands only, remount the other side of the tyre by pushing the edge toward the centre of the rim. Start either side of the valve and work around the rim.
- 13 . Before the tyre is completely mounted push the valve up into the rim to make sure the tyre can sit squarely in position.
- 14 . Fit the rest of the tyre, rolling the last, most difficult, part on using your thumbs.

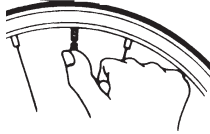
Note: Avoid using tyre levers as these can easily puncture the tube or damage the tyre.

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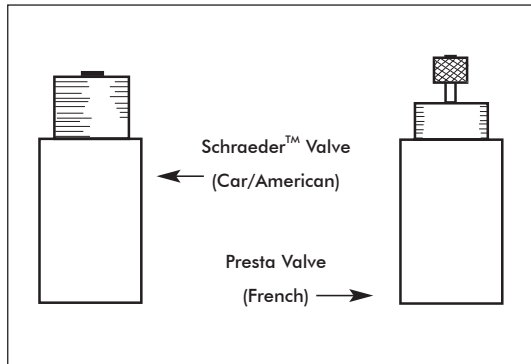
15 . Check that the tube is not caught between the rim and the tyre bead at any point.



16 . Using a hand pump, inflate the tube until the tyre begins to take shape, and check the tyre bead is evenly seated all the way around the rim. When properly seated, fully inflate the tyre to the pressure marked on the sidewall. Use a tyre air pressure gauge to check.



17 . Replace the wheel into the frame checking that all gears, brakes and quick release levers are properly adjusted.



Tyre Valves

Bicycles today commonly use one of two kinds of tyre valves. In order to inflate tyres you must have the appropriate attachment on the pump to fit the bicycle valve stem.

The most commonly used type is the same that is used on cars and is known as the car valve, American valve or Schraeder™ valve. Tube inflation with these valves is easily achieved using a hand pump or service station pump by removing the valve dust cap, and then screwing on or pushing on the pump connector to the end of the valve stem. Deflation is a simple matter of depressing the pin in the end of the valve stem.

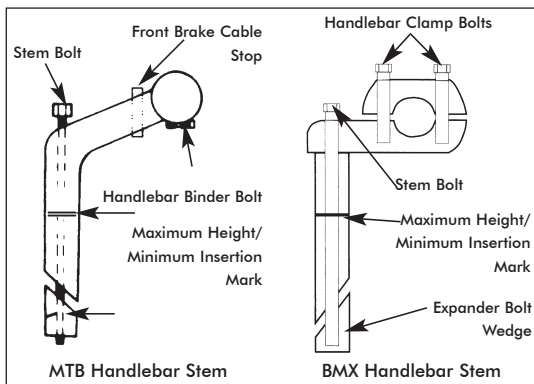
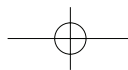
Note: Always replace the valve dust cap to prevent entry of dirt and damage to the valve.

The other commonly used valve type is the Presta valve, also known as the French or high pressure valve.

This type of valve is narrower and requires a pump with a special fitting to inflate. An adaptor screwed onto the valve stem can also be used to allow inflation via a car type pump hose. To inflate, remove the dust cap, unscrew the valve stem locknut, push down on the valve stem to free it up, then fit the pump head and inflate. To deflate, open the valve stem locknut and depress the valve stem.

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STEERING SYSTEM

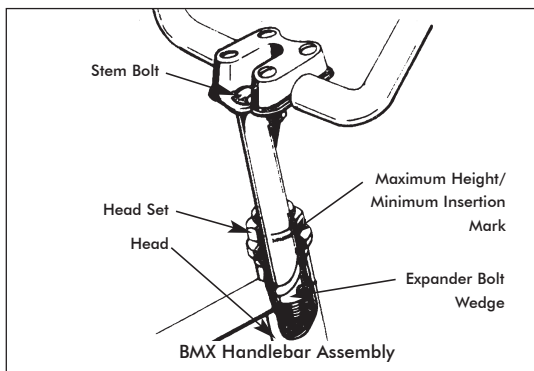
Handlebar Stem

On most bikes a standard handlebar stem fits into the steering column and is held firm by the action of a binder bolt and expander wedge which, when tightened, binds with the inside of the fork, steerer tube. Some bikes now use a different, "Ahead", system whereby the stem clamps onto an unthreaded fork steerer. When removing a standard stem, loosen the expander bolt two or three turns, then give it a tap to loosen the wedge inside.

Lubricate by first wiping off any old grease and grime, then applying a thin film of grease to the part, including the wedge, that will be inserted into the frame.

The height of the handlebar can be adjusted to suit your comfort preference. (Refer to Part 3).

If the stem is removed from the steering column you will notice a mark about 65mm up from the bottom with the words "max. height" or "minimum insertion".



Never ride a bicycle if the stem has been raised so that the minimum insertion / max. height line can be seen.

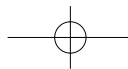
On some MTB bicycles the front brake cable is routed through a hole in the front of the stem.

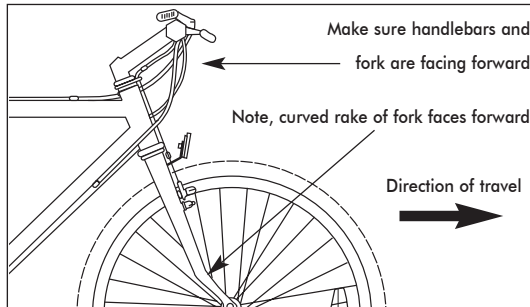
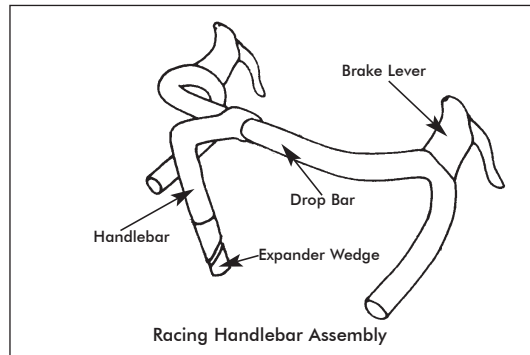
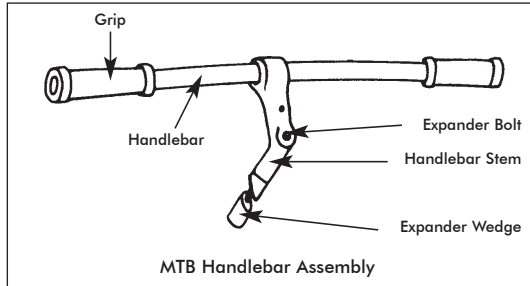


If the height is adjusted on this type of stem you will need to re-adjust the front brake.



If your bicycle is fitted with a suspension type handlebar stem, then be sure to check that this is intact and functioning correctly.





When re-fitting the stem, make sure the handlebars are correctly aligned and tightened using the appropriate hex wrench or allen key to a minimum 17Nm of torque. Do not overtighten.

Test the security of the handlebars within the stem, and the stem within the fork steerer tube, by clamping the front wheel between your knees and trying to move the handlebars up and down and from side to side. The handlebar should not move when applying turning pressure.

Handlebars / Forks

The exact positioning of the handlebar is a matter of personal comfort. For MTB bicycles, the bar should be approximately horizontal, with the ends pointing back and slightly down. For racing bicycles with drop-style handlebars, the ends should be pointing toward the rear wheel hub. On BMX bicycles, the handlebar should remain in an approximately upright position, but can be angled back or forward slightly for comfort. On MTB and Racing style bicycles the handlebar is usually tightened in the stem by a single allen key bolt or hexagonal bolt. BMX style bicycles may have four clamping bolts. Tighten to 18Nm .



Never ride unless the handlebar clamping mechanism has been securely tightened.

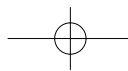


Check handlebar grips and tube end plugs regularly and replace if damaged. This is particularly important on bicycles used by children, as exposed ends on handlebars can cause injury.

Make sure, when setting the handlebars in the fork, that the curved rake of the fork is angled to the front of the bicycle.



Replacement forks must have the same rake and the same tube inner diameter as those originally fitted to the bicycle.



Bicycle Suspension

Some Mountain Bikes come equipped with suspension systems that are designed to provide a smoother more comfortable riding experience by lessening some of the shocks or jarring effects encountered when riding on roads with irregular surfaces such as unsealed gravel, or those with undulating surfaces. There are many different types of suspension systems - too many to deal with individually in this manual.

Suspension can increase the handling capabilities and comfort of your bicycle. This enhanced capability may allow you to ride faster; but you must not confuse the enhanced capabilities of the bicycle with your own capabilities as a rider.

Bicycling can be a potentially hazardous activity. We recommend that you do not use your bicycle in the following manner; competitive events, bicycle racing, dirt biking, ramp riding, jumping, stunt riding, downhill racing or similar activities or training for such competitive activities or events.

Increasing your skill will take time and practice. Proceed carefully until you are sure you are competent to handle the full capabilities of your bike.

If your bicycle has a suspension system of any kind, refer to the separate leaflet (where supplied) or ask your specialist dealer to provide you with the appropriate adjustment and maintenance instructions.

Suspension systems may also include suspension seat posts and suspension handlebar stems that are designed to provide a more comfortable ride.



WARNING: Failure to check and properly adjust the suspension system may result in suspension malfunction, which may cause you to lose control and fall. Exposed moving portions of suspension system must be kept clean.



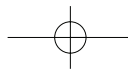
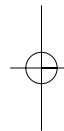
CAUTION: Changing suspension adjustment can change the handling and braking characteristics of your bicycle. Never change suspension adjustment unless you are thoroughly familiar with the suspension system manufacturer's instructions and recommendations. Always check for changes in the handling and braking characteristics of the bicycle after a suspension adjustment by taking a careful test ride in a hazard-free area.

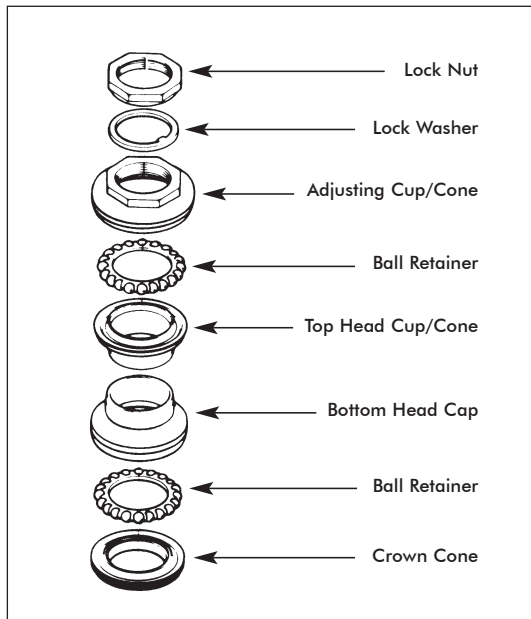


CAUTION: Not all bicycles can be safely retrofitted with some types of suspension systems. Before retrofitting a bicycle with any suspension, check with the bicycle's manufacturer to make sure that what you want to do is compatible with the bicycle's design. Note that any change from makers specifications may void your bicycle warranty.



WARNING: If your bike has suspension, the increased speed you may develop also increases your risk. When braking, the front of a suspended bike dips. You could lose control and fall if your skill is not up to handling this system. Get to know how to handle your suspension system safely before trying any downhill or very fast riding.





Headset

Inspection

The headset bearing adjustment should be checked every month. This is important, as it is the headset which locks the fork into the frame, and if loose can cause damage or result in an accident.

While standing over the frame top tube with both feet on the ground, apply the front brake firmly and rock the bicycle back and forward.

If you detect any looseness in the headset, it will need adjustment.

Check that the headset is not overtight by slowly rotating the fork to the right and left. If the fork tends to stick or bind at any point, the bearings are too tight.

Adjustment

Loosen the headset top locknut or remove it completely along with the reflector bracket, if fitted. Turn the adjusting cup clockwise until finger tight. Replace the lock washer or reflector bracket and re-tighten the lock nut using a suitable wrench.

Note: Do not overtighten or bearing damage will occur.



Always make sure that the headset is properly adjusted and that the headset locknut is fully tightened before riding.

"AheadSet" Type Assemblies

This type of head set differs from standard types by utilising an unthreaded, full-thickness bicycle fork steering tube. The mechanism is adjusted via an Allen headed compression bolt, then fastened by clamping the handlebar stem directly onto the fork steerer.

If assembling a new bike with this type of fitting, remove dust cap covering the Allen head bolt and unscrew bolt holding the top plug. Remove cardboard cover. Slip handlebar stem over exposed fork steerer and replace top plug. Make sure handlebars and forks are facing the front. Tighten down the steering assembly via the Allen head centre bolt so there is no freeplay. Do not overtighten. Tighten up the binder bolts which clamp the handlebar stem to the fork steerer. The handlebar and stem must not be able to turn on the steerer tube.

If adjustment is later required: loosen the stem binder bolts, re-seat the compression mechanism via the Allen bolt, then securely re-tighten the stem binder bolts.



Fastening An Ahead Stem To The Fork

Lubrication

A complete lubrication should be carried out every year. This is a complicated procedure which you may wish to refer to a specialist bicycle dealer. However the following procedure should enable you to carry out the work yourself.

- 1 . Find a way to suspend the bicycle so that the front wheel is off the ground.
- 2 . Remove the handlebar assembly from the steering tube.
- 3 . Loosen and remove the headset locknut, followed by the lockwasher and reflector bracket, if fitted.
- 4 . Support the forks with one hand and remove the adjusting cup, followed by the upper ball retainer.
- 5 . Pull the forks out of the frame and remove the lower ball retainer.
- 6 . Thoroughly clean and inspect for damage each part of the headset. Replace if necessary.
- 7 . Pack grease into both head cups. Re-fit a ball retainer into the lower head cup and work grease into it. Then fit the forks into place.
- 8 . Re-fit a ball retainer into the upper adjusting cup and pack grease into it. Then screw the cup down onto the fork steerer and into position.
- 9 . Adjust the upper cup by hand until no movement can be felt in the forks.
- 10 . Replace the lock washer, reflector bracket and lock nut, tightening securely, then replace and securely tighten the handlebar assembly.

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Rotors

Some BMX Freestyle bikes are equipped with a Rotor - a special headset mechanism which allows the handlebars to be turned 360 degrees without causing the brake cables to become tangled. The front brake cable is routed through the centre of a hollow headset and the fork, then up to the right control lever. The rear brake cable is split at the rotor bearing mechanism which transfers the left control lever pressure to actuate the rear brake. The system must be correctly adjusted. Components will already be installed on a new bike but the cables may need connecting.

Rotor Installation and Adjustment

UPPER CABLE

1. First connect the barrel end of the upper cable to the left rear brake lever. Make sure the long casing is on top of the short cable casing; otherwise, the upper cable will have a twist in it.
2. Route the upper cable through the handlebars (below the crossbar) with the short cable casing on the same side as the rear brake lever.
3. Connect the upper cable to the upper plate by passing the football ends of the upper cable through the threaded holes in the upper plate and connecting them to the bearing.
4. Screw the adjusting barrels into the upper plate. Don't tighten the locknuts at this time.

LOWER CABLE

1. Slide the cable casing through the cable guide on the frame.
2. Connect the lower cable to the lower plate by passing the football ends of the lower cable through the threaded holes in the lower plate and connecting them to the bearing.
3. Screw the adjusting barrels into the lower plate. Don't tighten the locknuts at this time.
4. Connect the lower cable to the rear brake. Don't adjust the rear brake at this time.

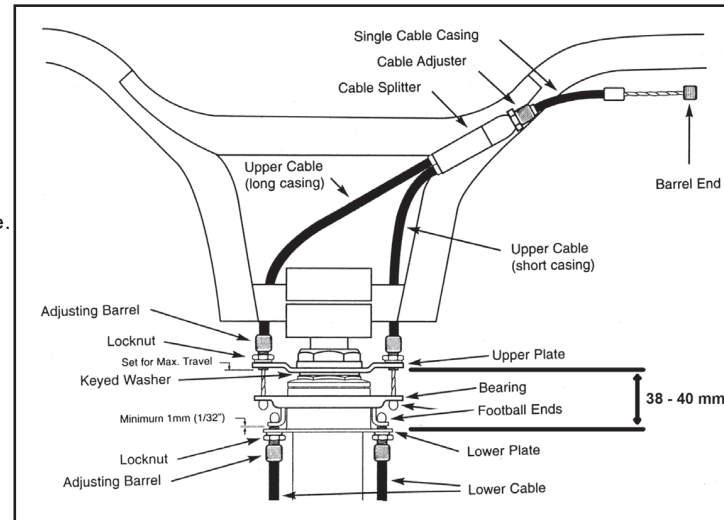
NOTE: Check to make sure all 11 cable casing ends on the upper and lower cables are seated correctly, and that the spring tension of the rear brake is pulling the bearing down.

ADJUSTMENT

1. Screw the cable adjusters on the rear brake lever and the upper cable splitter all the way in.
2. Screw the adjusting barrels in the upper plate in (or out) to set the bearing for maximum travel. The bearing should be as far down as it can go without resting on the lower plate or the adjusting barrels that are screwed into the lower plate.
3. Use the adjusting barrels that are screwed into the upper plate to make the bearing parallel to the upper plate. Use a 10mm wrench to tighten the locknut on the left adjusting barrel of the upper cable. Leave the right adjusting barrel loose.
4. Screw the lower cable adjusting barrel into (or out of) the lower plate until they are as close to the bearing as they can get without touching it.
5. Screw the cable adjuster on the upper cable splitter out until all slack is removed from the upper cable. Then screw the cable adjuster out one more turn to raise the bearing an additional 1mm away from the lower cable adjusting barrels.

CAUTION: Don't screw the cable adjuster on the upper cable splitter out more than 8mm. Use the cable adjuster on the rear brake lever if more adjustment is needed.

6. Check for bearing flop by placing the handlebars in the normal riding position, then quickly rotate the handlebars back and forth. Perform the following steps to eliminate bearing flop.
- NOTE: The bearing should never be allowed to rest on the lower plate or lower cable adjusting barrels.
- Screw the lower cable adjusting barrels out of (or into) the lower plate until all bearing flop is eliminated.
 - Tighten the locknut of the right adjusting barrel on the lower cable.
 - Rotate the handlebars 180 degrees and recheck for bearing flop. If there is any bearing flop, use the "loose" adjusting barrels on the upper and lower cable to remove it.
 - Repeat steps (6a) and (6c) until the handlebars can be rotated 360 degrees without any bearing flop.
7. Finish adjusting the rear brakes.



SADDLE AND SEAT POST

Inspection

The seat fixing bolt and the seat post binder bolt should be checked for tightness and adjustment every month. On removing the seat post from the frame, you will notice a mark near the bottom of the seat post with the words "max. height" or "minimum insertion".



Never ride a bicycle with the seat post raised beyond the minimum insertion/max. height mark.

This may cause damage to either the seat post, the frame or possibly the rider. The minimum insertion mark on the seat tube must always remain in the frame.





Lubrication

Remove the seat post from the frame and wipe off any old grease rust or dirt. Then apply a thin film of new grease to the part that will be inserted into the frame. Re-insert, adjust and tighten the seat post in the frame.

Adjustment

As mentioned in Part 3, the seat can be adjusted in height, angle and distance from the handlebars to suit the individual rider. Saddle angle is a matter of personal preference but when the top of the seat is almost parallel to the ground, or slightly raised at the front, the most comfortable position will usually be found.



WARNING: After any saddle adjustment, be sure to tighten the saddle adjustment mechanism properly before riding. A loose saddle clamp or seat post binder can cause damage to the seat post, or can cause you to lose control and fall. A correctly tightened saddle adjusting mechanism will allow no saddle movement in any direction. Periodically check to make sure that the saddle adjusting mechanism is properly tightened.

The saddle can also be adjusted by sliding it forward or back along the mounting rails to obtain the most comfortable reach to the handlebars. Then, retighten the saddle clamping mechanism as tight as you can. When fitting, position the seat post into the clamp under the seat and place it in the frame without tightening. Adjust to the desired angle and position, and tighten the clamping mechanism.

There are two types of seat clamp commonly in use. The most common employs a steel clamp with hexagonal nuts on either side to tighten. The other type, known as a micro-adjustable clamp, uses a single vertically mounted Allen head fixing bolt to tighten. After fixing the seat to the desired position on the post, adjust the height to the required level and tighten the binder bolt. Note that the type of binder bolt may be either a hexagonal bolt, an Allen head bolt, or a quick release mechanism. The operation of a seat post Quick Release mechanism is the same as for Quick Release hubs. Refer P.41 Test the security by grasping the seat and trying to turn it sideways. If it moves you will need to further tighten the binder bolt.

Note: Remember that the minimum insertion mark must remain inside the frame assembly.

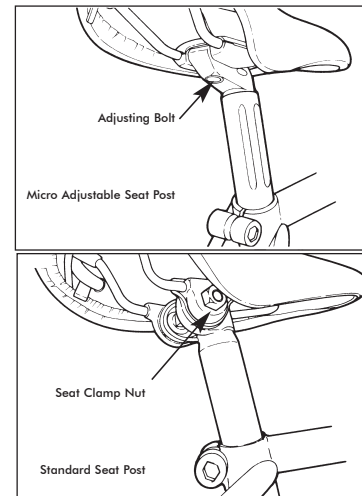


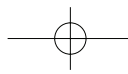
WARNING: Riding with an improperly tightened seat post can allow the saddle to turn or move and cause you to lose control and fall. Therefore:

1. Ask your dealer to help you make sure you know how to correctly clamp your seat post.
2. Understand and apply the correct technique for clamping your seat post quick release.
3. Before you ride the bike, first check that the seat post is securely clamped.



CAUTION: If your bicycle is fitted with a suspension type seat post then be sure to check this is intact and functioning correctly.



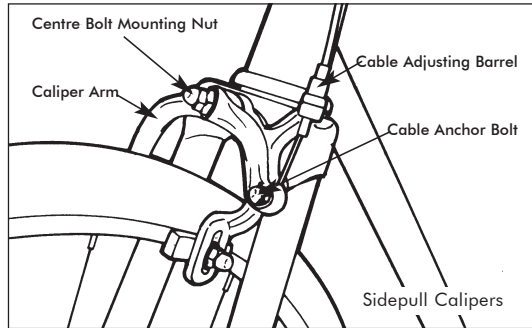


BRAKES

The correct adjustment and operation of your bicycle's brakes is extremely important for safe operation. Brakes should be checked for effective operation before every ride. Frequent checking of adjustment is necessary as the control cables will stretch and the brake pads will become worn with use.



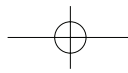
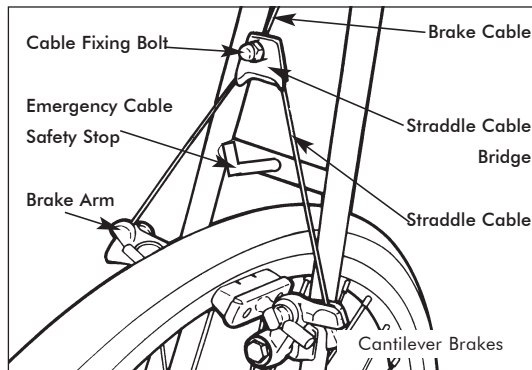
WARNING: Never ride a bicycle unless the brakes are functioning properly. Sudden or excessive application of the front brake may pitch the rider over the handlebars, causing serious injury or death.



There are several commonly used types of bicycle hand operated brakes, including sidepull, cantilever, "V" type or "Linear Pull" type, and "U" type caliper brakes. These utilise a handlebar mounted control lever which actuates a cable to operate the brake. Sidepull caliper brakes are mounted to the frame or fork via a single pivot point. Cantilever, "V" type or "Linear Pull" type, and "U" type brakes use two brake pivot arms, each mounted on separate pivots on either side of the frame or fork.

Inspection

Brake levers should be checked for tightness at least every three months. They should be set in a comfortable position within easy reach of the rider's hands, and must not be able to move on the handlebar. Some brake levers make use of a screw adjuster, which can be altered to change the distance between the handlebar grip and the lever as required. The brake pads should be checked for correct positioning and tightness before every ride, and the various bolts and nuts at least every three months. Squeeze each brake lever to make sure they operate freely and that the brake pads press hard enough on the rims to stop the bike. There should be about 1.5mm - 2mm clearance between each pad and the rim when the brakes are not applied. The brake pads must be properly centred for maximum contact with the rim. Replace the brake pads if they are over worn so that the grooves or pattern cannot be seen.





Some brakes have a Quick Release mechanism to allow easier wheel removal. Whenever you adjust the brakes, make sure the QR mechanism is in the closed position.



Never ride unless the Quick Release is firmly locked in the closed position.

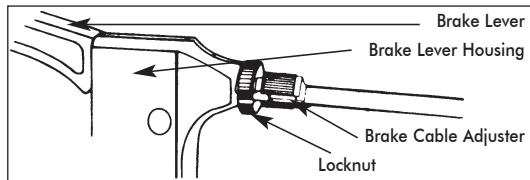
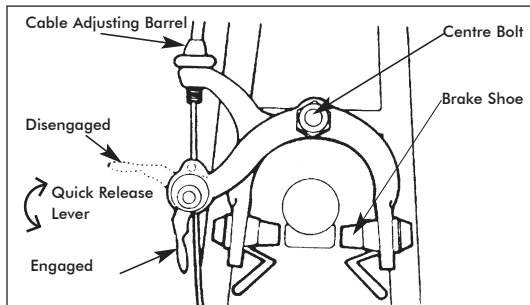
The brake cable wires should be checked for kinks, rust, broken strands or frayed ends. The outer casing should also be checked for kinks, stretched coils and other damage. If the cables are suspect they should be replaced.

Lubrication

The brake lever and brake caliper pivot points should be oiled with 2-3 drops of light oil at least every three months, to ensure smooth operation and to reduce wear.

Cables should be greased along their entire length, after removing them from their casings, at least every six months.

Always grease new cables before fitting.



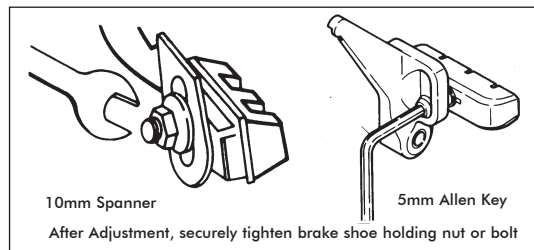
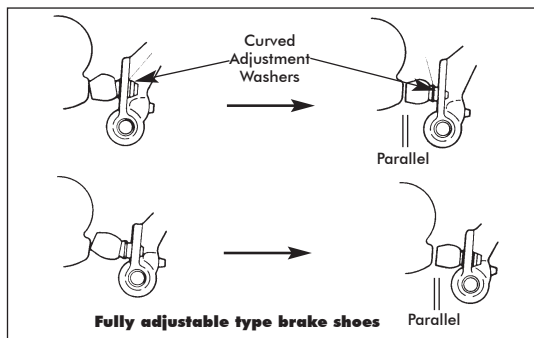
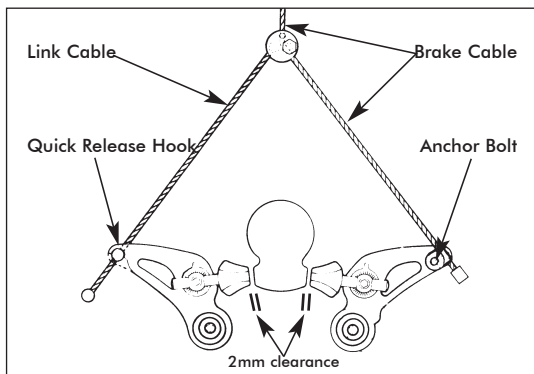
Adjustment - Sidepull Calipers

Minor brake adjustment can be made via the barrel cable adjuster, usually located at the upper cable arm. To adjust, squeeze the brake pads against the rim, loosen the lock nut and turn the adjuster. Brake pad clearance should be a maximum 2mm from the rim.

When correct, re-tighten the lock nut.

If the pads cannot be set close enough to the rim in this manner, you may have to adjust the cable length. Screw the barrel adjuster 3/4 of the way in, squeeze the pads against the rim, undo the cable anchor bolt and pull the cable through with pliers. Re-tighten the cable anchor bolt and apply full force to the brake lever to test, then fine tune using the barrel adjuster.

If one pad is closer to the rim than the other, loosen the fixing nut at the back of the brake, apply the brake to hold it centred, and re-tighten the fixing nut. Some brakes have a special mechanism which enables you to set the clearance on either side of the rim using a screwdriver.



Brake pads should finally be adjusted so that the leading edge of the pad makes first contact with the rim. Some brakes have special curved washers to allow this, but on less complex models it will be necessary to apply a little force to the pad and its mounting.

Adjustment - Cantilever Calipers

Minor brake adjustment can be made via the barrel cable adjusters which are located on each brake lever. To adjust, squeeze the brake pads against the rim, loosen the lock nut, and turn the adjuster to pull the brake pads closer to, or spread them away from the rim as required.

Brake pad clearance should be a maximum 2mm from the rim.

When correct re-tighten the lock nut.

If the pads cannot be set close enough to the rim in this manner, you may have to adjust either the length of the straddle cable

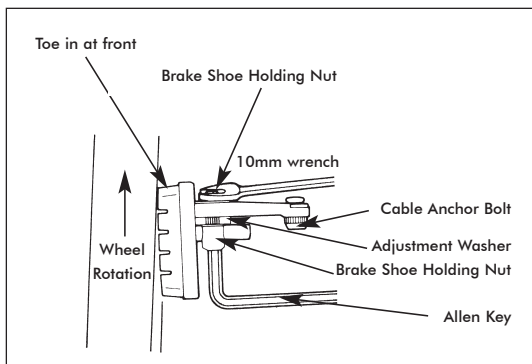
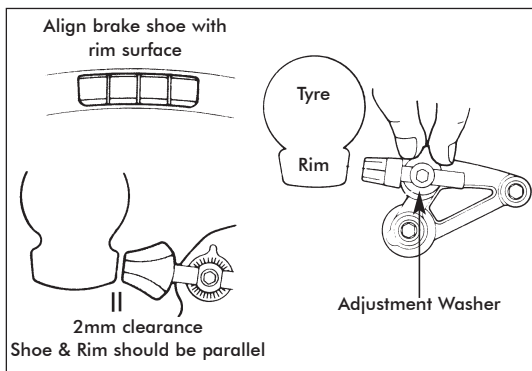
or the length of the brake cable.

If the brakes use a separate brake cable and straddle cable, adjust the straddle length by first, screwing the barrel adjuster 3/4 of the way in, then loosening the straddle cable fixing bolt, then pulling or pushing the cable through the fixing bolt to adjust the length, and finally re-tightening the fixing bolt.

Check that the straddle bridge is in the middle of the cable to ensure even brake pad contact. Apply full force to the brake lever to test, then fine tune using the barrel adjuster.

To adjust the brake cable length, loosen the brake cable fixing bolt on the cable straddle bridge, adjust the length until the brake shoes are the correct distance from the rim, then re-tighten and test.





On some newer type cantilever brakes, the main brake cable continues through the central cable carrier to an anchor bolt on one of the brake arms. A shorter link cable reaches from the carrier and the hook on the other brake arm. Adjustment of the cable length is made after loosening the anchor bolt on the brake arm.

Adjust the brake pad position so that it is parallel to the wheel rim and so that the leading edge makes first contact.

To do this, fit an Allen key into the brake pad holding bolt, loosen the fixing nut and adjust. Move the brake pad along it's mounting post to alter the distance from the rim, and move the curved adjustment washer to alter the angle of the pad.

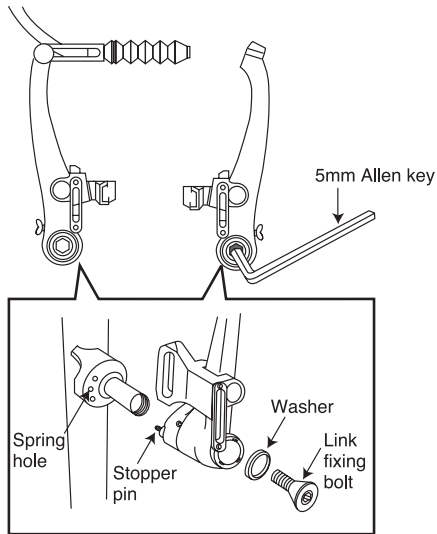
On some models there is a spring-force adjustment screw on the brake arm which allows further fine tuning of the brake shoe position.

Bicycles with cantilever brakes must be fitted with safety devices to prevent a possible accident in the event of the brake control cable or the straddle bridge becoming loose or breaking whilst riding.

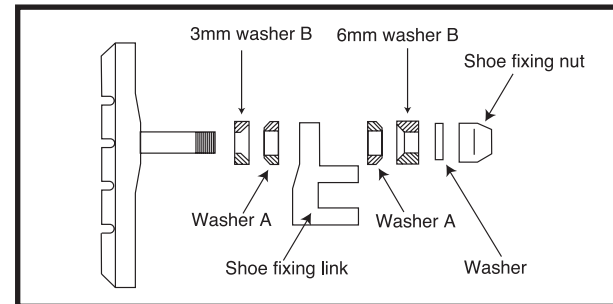
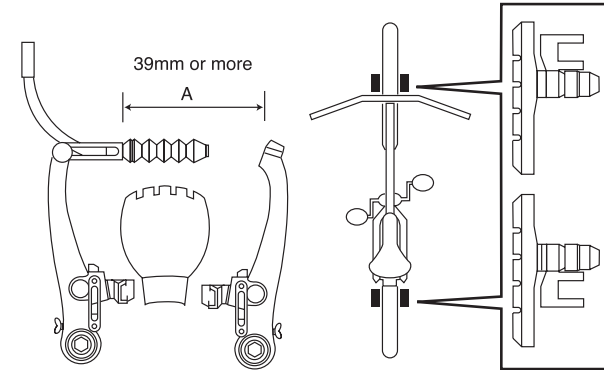
These are usually the reflector brackets, and must be fitted front and rear. The bracket will prevent the straddle cable fouling the wheel should it become disconnected from the control cable. If reflector brackets are not fitted in this position, then alternative emergency cable safety stops must still be fitted. Refer diagram P. 53.

Adjustment - Linear Pull Brakes

1. If assembling linear pull brakes insert the brake body into the centre spring hole in the frame mounting boss, and then secure the brake body to the frame with the link fixing bolt.

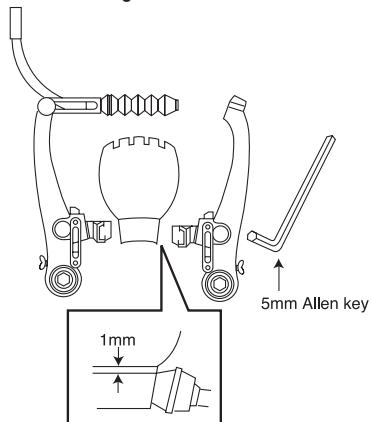


2. While holding the shoe against the rim, adjust the amount of shoe protrusion by interchanging the position of the B washers (i.e. 6mm and 3mm) so that dimension A is kept at 39mm or more.

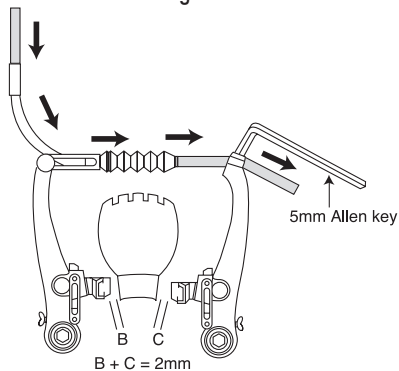




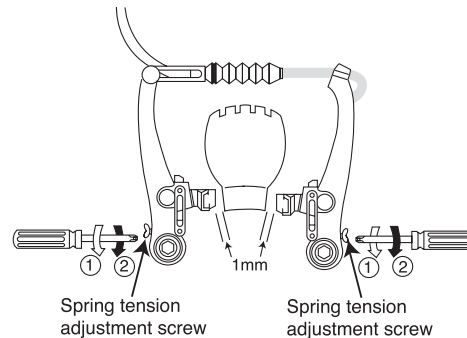
- 3.** While holding the shoe against the rim, tighten the shoe fixing nut.



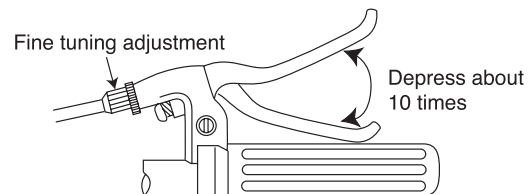
- 4.** Pass the inner cable through the inner cable lead. Set the cable with a clearance of 1mm between each brake pad and the rim, tighten the cable fixing bolt.

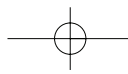


- 5.** Adjust the balance with the spring tension adjustment screws.



- 6.** Depress the brake lever about 10 times as far as the grip and check that everything is operating correctly and that the shoe clearance is correct before using the brakes. If further adjustment is required, loosen and then re-tighten cable fixing bolt as per 4. Fine tuning can be achieved via the adjusting screw at the brake lever.





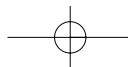
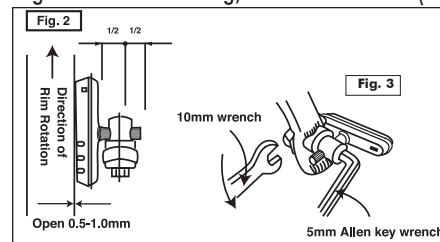
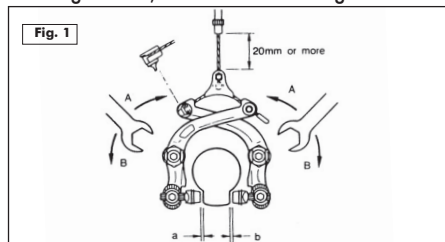
Adjustment / Installation - U-Brakes

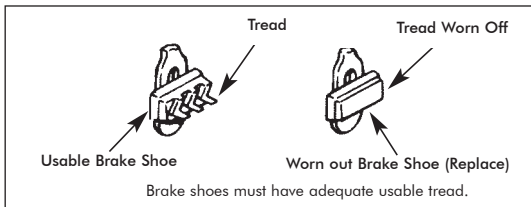
1. Installation to frame.
 - a. Apply grease (lubricant) on the contacting surfaces of the frame bosses and the brake arm attaching area.
 - b. Note that spring winding direction for right and left arms is different. (see Fig. 1)
 - c. Be sure that spring is securely attached to the hole on the brake arm, spring cover and arm fixing nut. Then tighten the attaching bolt with a 5mm Allen key wrench. Tightening torque should be 60 to 80 kgf. cm.

2. Adjusting and Fixing Brakeshoes.
 - a. Brake arm should have free movement when adjusting brakeshoe. Be sure to place the brakeshoe so that the direction of the arrow sighth is the same direction of rim rotation.
 - b. Facing the shoe surface to the rim, set it as shown in Fig 2.
 - c. Hold the brake in position with a 5mm Allen key wrench and tighten the nut with a 10mm wrench. (the tightening torque should be 70 to 90 kgf.) see fig 3.

3. Connecting to Braking Cable See fig 1.
 - a. Attach the braking cable to the straddle cable bridge.
 - b. Set the straddle cable as in fig 1, and adjust the shoe-rim leaving clearance of 1.5mm on both sides.
 - c. Tighten the straddle cable with the cable fixing nut. Tightening torque should be 50 to 70 kgf. cm.
 - d. Cut off the excess straddle cable and attach the cable cap.

4. Tuning the shoe clearance and spring tension.
 - a. When the left side (a in fig 1 is greater than b, turn the arm fixing nut in the A direction. (counter clockwise with a 13mm wrench.) When the right side is greater than a, turn the arm fixing nut in the B direction (clockwise). (use a 13mm wrench)
 - b. When spring tension is tightened, turn the arm fixing nut to A and A' in fig 1. When loosening, turn to B and B'. (use 13mm wrench)





Brake Shoe Replacement

Brake shoes must be replaced if worn so far that there is insufficient effective pad material remaining or they are worn past the "wear line" indication. To replace, first remove the worn brake shoes after disconnecting the holding mechanism. Depending on the type of brake, as described on previous pages, the holding mechanism may be a hexagonal nut or an Allen screw arrangement, or a combination of both. Take note of the order and position in which the various curved washers and spacers are attached. Fix the new brake shoes, adjusting the angle and clearance to the rim as previously described, and tighten firmly. It will usually be necessary to adjust the rim clearance after first loosening the control cable anchor bolt, then screwing in cable adjusters and finally tensioning the cable. Be sure to re-fasten the anchor bolt after adjusting the cable. Always replace brakeshoes in pairs - never one side only. Before riding test brakes to ensure they are effective. Worn out Brake Shoe (Replace) Usable Brake Shoe Brake shoes must have adequate usable tread.

Disc Brakes

If your bike is fitted with disc brakes, the rear brake will be already attached. Check all components for tightness and function before riding.

Installing the front disc

When installing the front disc to the hub, ensure the arrows on the disc are pointing in the direction of forward wheel rotation. Tighten the disc to hub with the M5 screws disc mounting bolts, in a star pattern sequence, using torque of 5-8 NM.

Installing the front caliper


1. Install caliper on front fork lugs, and tighten front fork M6 screws to torque 8-10NM.
2. Thread the inner brake cable through the top cable adjuster on the caliper, and then through the actuating arm, tightening the cable anchor bolt to torque 6-8NM to secure firmly.
3. Loosen the cable adjuster screws on inside part of caliper, and check the gaps between the inner and outer pads and the disc are suitable. Manually push the pads so they almost touch the disc, and then retighten adjuster screws to 8-10NM.
4. Check the wheel runs freely when brake lever is released. If further adjustment is required, turn the adjusting nut/screw accordingly, and tighten. Activate levers to check brakes are working correctly.

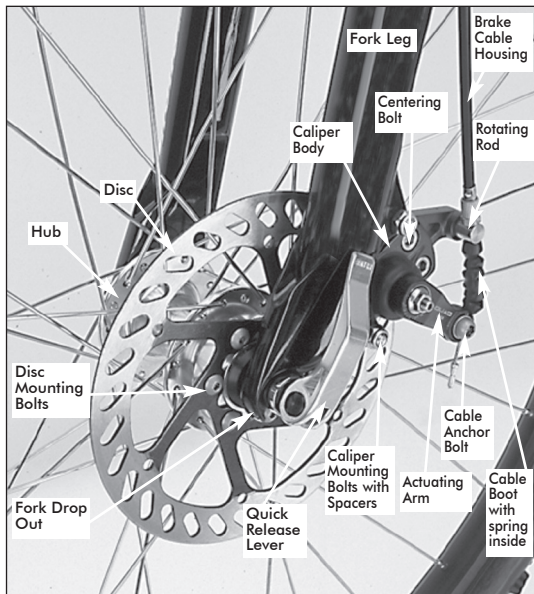
To prevent adjustment screws from working loose, ensure Internal Caliper fixing screw is tight (4-6nm).

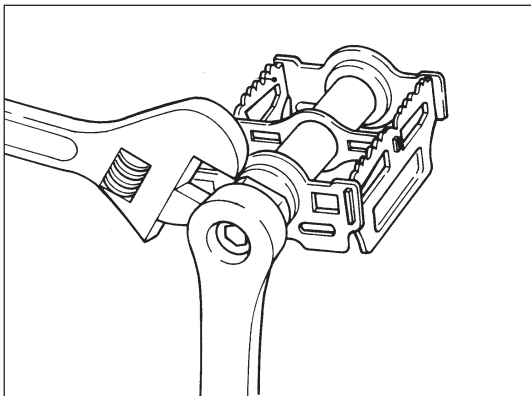
Adjust or Change brake pads

When brake force weakens, brake pads may be worn. Adjustment can be actioned through steps 3 and 4 above. If pads require replacement, loosen internal caliper fixing screw, remove outer then inner pad, and then replace inner then outer pad. Then follow the steps for installing the front caliper above.

 **WARNING** Discs get hot with use. To avoid injury, take care not to contact with hands or legs.

 **WARNING** Disc brakes require initial wearing in to function correctly. Ride gently for several kilometres before braking heavily in sudden, fast or downhill conditions. Brake performance will change over the wear in period. Clean the brake disc before first ride using methylated spirit. Never clean using oil or other lubricants.





DRIVETRAIN

The drivetrain of a bicycle refers to all parts that transmit power to the rear wheel, including the pedals, chain, chainwheel and crank set, and freewheel.

Pedals

Pedals are available in a variety of shapes, sizes and materials and each are designed with particular purposes in mind. Some pedals can be fitted with toe clips and straps. These help to keep the feet correctly positioned and allow the rider to exert pulling force, as well as downward pressure, on the pedals. Use of toe clips with straps requires practice to acquire the necessary skill to operate them with safety.



Never ride in traffic with fully tightened toe straps.

While toeclips and straps give some benefit with any kind of shoe, they work most effectively with cycling shoes designed for use with toeclips. Your dealer can explain how toeclips and straps work.



WARNING: Getting into and out of pedals with toeclips and straps requires skill which can only be acquired with practice. Until it becomes a reflex action, the technique requires concentration which can distract the rider's attention, causing you to lose control and fall. Practice the use of toeclips and straps where there are no obstacles, hazards or traffic. Keep the straps loose, and don't tighten them until your technique and confidence in getting in and out of the pedals warrants it. Never ride in traffic with your toe straps tight.

Inspection

Pedals should be inspected every month, taking note of the following areas.

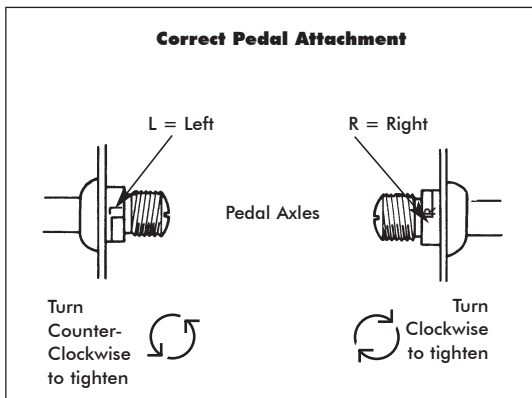
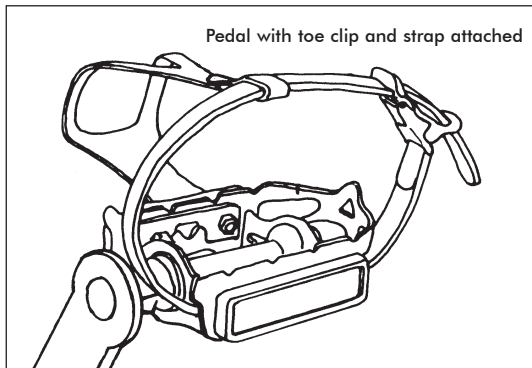
- Check correct tightness into the cranks. If pedals are allowed to become loose they will not only be dangerous but will also cause irreparable damage to the cranks.



Never ride with loose pedals.

- Check that pedal bearings are properly adjusted. Move the pedals up and down, and right to left, and also rotate them by hand. If you detect any looseness or roughness in the pedal bearings then adjustment, lubrication or replacement will be required.
- Ensure front and rear pedal reflectors are clean and securely fitted.
- Ensure toe clips, if fitted, are securely tightened to the pedals.





Lubrication and Adjustment

Many pedals cannot be disassembled to allow access to the internal bearings and axle. However, it is usually possible to inject a little oil onto the inside bearings, and this should be done every six months. If the pedal is the type that can be fully disassembled, then the bearings should be removed, cleaned and greased every six to twelve months. Because of the wide variety of pedal types and their internal complexity, disassembly procedures are beyond the scope of this manual and further assistance should be sought from a specialist.

Attachment

Note: The right and left pedals of a bicycle each have a different thread and are not interchangeable.

Never force a pedal into the incorrect crank arm.

The right pedal, which attaches to the chainwheel side, is marked 'R' on the end of the axle, and screws in with a clockwise thread. The left pedal, which attaches to the other crank arm, is marked 'L' on the axle, and screws in with a counter clockwise thread.

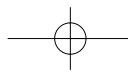
Insert the correct pedal into the crank arm and begin to turn the thread with your fingers only.

When the axle is screwed all the way in then securely tighten using a 15mm wrench.

If removing a pedal, remember that the right pedal axle must be turned counter clockwise and the left, clockwise ie. the reverse of when fitting.

If replacing the original pedals with a new set, make sure the size of the axle thread is compatible with the cranks on your bicycle. Bicycles use one of two types of cranks and these use different axle threads. Your bike may be equipped with cranks that are a one piece design with no separate axle. These operate with pedals that have a 1/2" (12.7mm) thread. Bikes equipped with three piece crank sets with a separate axle, left crank and right crank, use a slightly larger 9/16" (14mm) thread.

Note: Never try and force a pedal with the wrong thread size into a bicycle crank.



Clipless ("Step-In") Pedals

Clipless pedals (sometimes called "step-in pedals") are the means most racers use to keep their feet securely in the correct position for maximum pedalling efficiency. They work like ski bindings- a plate on the sole of the shoe clicks into a spring-loaded fixture on the pedal.

Clipless pedals require shoes specifically designed for the make and model pedal being used.

Many clipless pedals are designed to allow the rider to adjust the amount of force needed to engage or disengage the foot. Your dealer can show you how to make this adjustment.



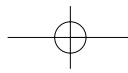
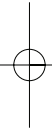
WARNING: Clipless pedals are intended for use with shoes specifically made to fit them and are designed to keep the foot firmly engaged with the pedal.

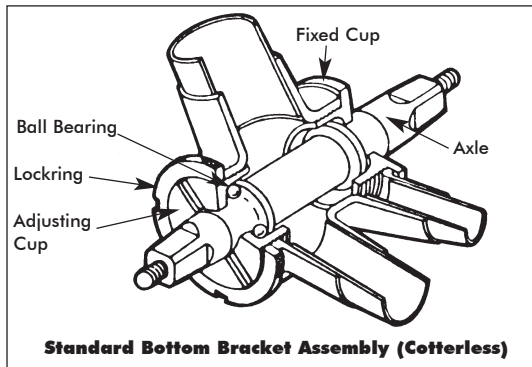
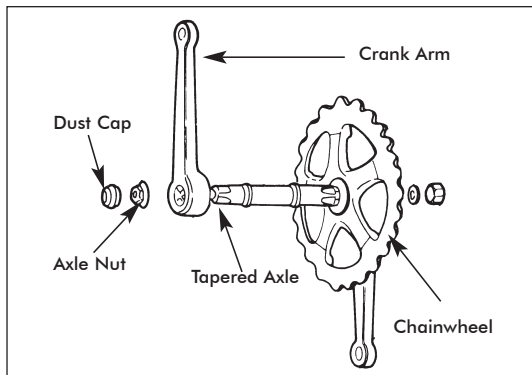


WARNING: Practice is required to learn to engage and disengage the foot safely. Until engaging and disengaging the foot becomes a reflex action, the technique requires concentration which can distract the rider's attention, causing the rider to lose control and fall. Practice engaging and disengaging clipless pedals in a place where there are no obstacles, hazards or traffic.



WARNING: Once this technique is mastered, it is safe to ride your bike.





Crank Set

The crank set refers to the Bottom Bracket axle and bearings, the Crank Arms and Chainrings.

Your bike may be fitted with either One Piece Cranks, where the crank arms and bottom bracket are a single component, or Cotterless Cranks, where the crank arms bolt onto the bottom bracket axle without using old fashioned type cotterpins.

The one piece system is simpler and requires less maintenance, while the cotterless system requires a little extra care.

Inspection

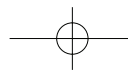
The crank set should be checked for correct adjustment and tightness every month. Cotterless crank axle nuts must be kept tight, and the bottom bracket bearings must be properly adjusted.

Remove the chain and try and move the cranks from side to side with your hands. The cranks should not move on the axle, and there should be only very slight movement in the bottom bracket. Next, spin the cranks. If they don't spin freely without grinding noise, then adjustment or lubrication will be needed.

Also check that there are no broken teeth on the chainrings, and wipe off excess dirt and grease that may have built up on them.



Never ride your bike if the cotterless cranks are loose. This may be dangerous and will damage the crank arms beyond repair.



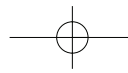
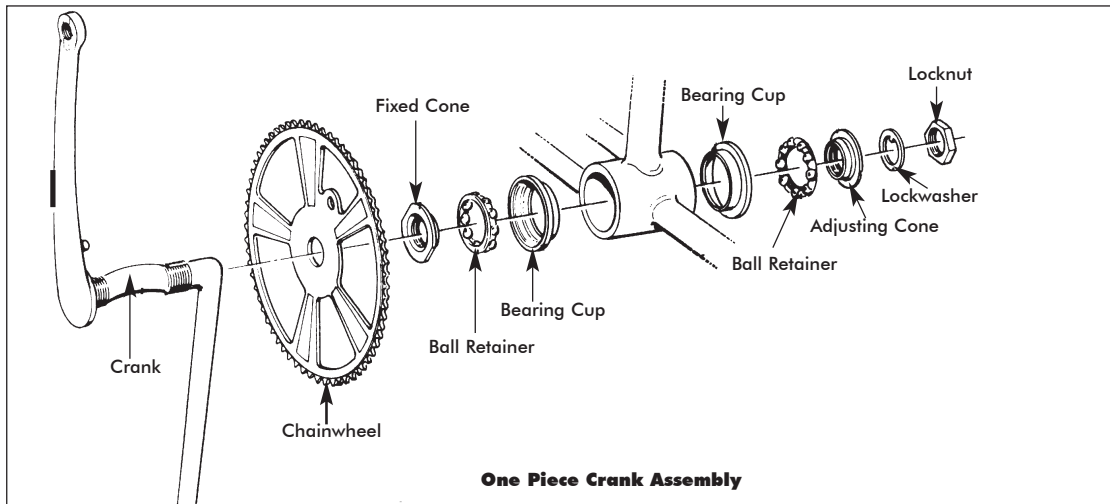
Lubrication and Adjustment - One Piece Cranks

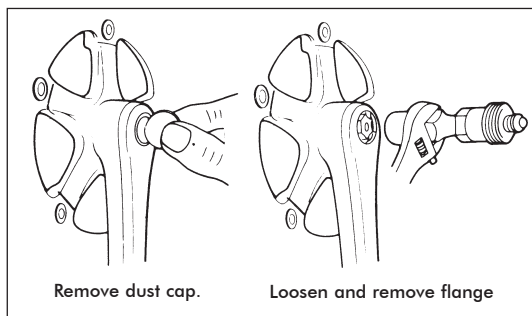
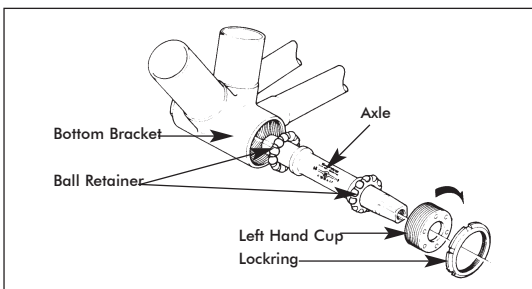
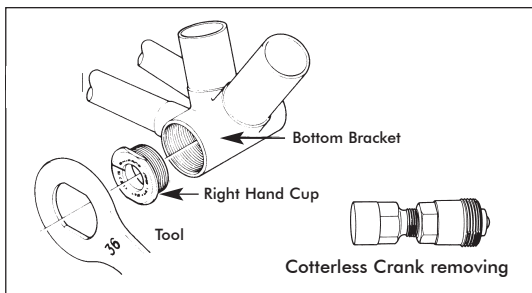
To adjust the freeplay in a one piece type bottom bracket, loosen the locknut on the left side by turning it clockwise and tighten the adjusting cone counter-clockwise using a screwdriver in the slot. When correctly adjusted re-tighten the locknut counter-clockwise.

To disassemble:

- 1 . Remove the chain from the chainwheel.
- 2 . Remove the left pedal by turning the spindle clockwise.
- 3 . Remove the left side locknut by turning it clockwise and remove the keyed lockwasher.
- 4 . Remove the adjusting cone by turning it clockwise with a screwdriver.
- 5 . Remove the left ball retainer, slide the crank assembly out of the frame to the right, and remove the right ball retainer.

Clean and inspect all bearing surfaces and ball retainers, and replace any damaged parts. Pack the ball bearing retainers with grease, then re-assemble in the reverse of the above procedure.





Lubrication and Adjustment - Cotterless Cranks

To adjust the freeplay in a three piece type bottom bracket, loosen the locking on the left side by turning it counter-clockwise, then turn the adjusting cup as required. Re-tighten the locking being sure not to alter the cup adjustment.

To disassemble:

- 1 . Remove the cranks from the axle.
- 2 . Remove the left side locking by turning it counter-clockwise.
- 3 . Remove the adjusting cup by turning it counter-clockwise.
- 4 . Remove the left ball retainer and slide the axle out of the frame to the left.
- 5 . Remove the right side fixed cup by turning it counter-clockwise and remove the right ball retainer.

Clean and inspect all bearing surfaces and ball retainers, and replace any damaged parts. Pack the ball bearing retainers with grease, then re-assemble in the reverse of the above procedure.

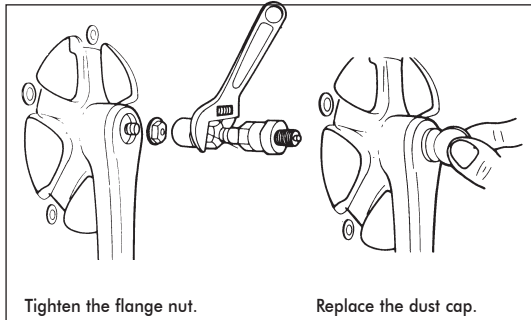
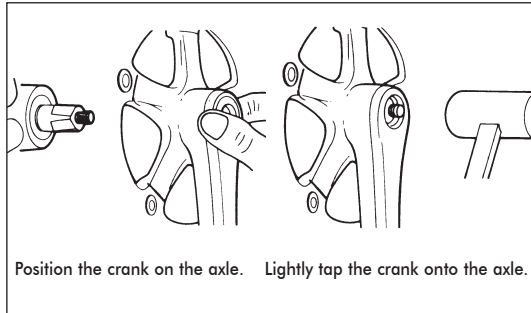
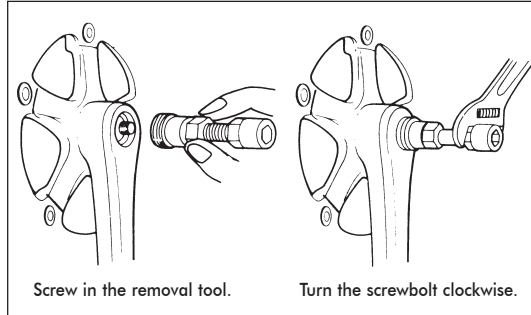
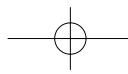
Cotterless Crank Removal

To remove cotterless cranks use the following procedure.

Note that a special tool will be required.

- 1 . Remove the dust cap with a coin or screwdriver.
- 2 . Loosen the flange nut or bolt and washer, and remove.
- 3 . Screw the removing tool into the crank and tighten.
- 4 . Turn the screw bolt down until the crank comes away from the axle.

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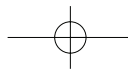
Cotterless Crank Replacement:

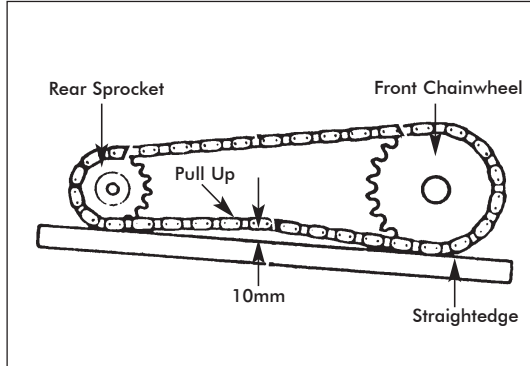
- 1 . Replace the crank arm onto the axle.
- 2 . Tap the crank arm lightly with a mallet.
- 3 . Refit the washer and tighten flange nut or bolt securely to a torque of 27Nm.
- 4 . Replace the dust cover.



New cotterless cranks may become loose with initial use. Perform the following task after several hours riding, and repeat it two or three times after further use. Cranks should then remain tight.

- 1 . Remove dust cap.
- 2 . Tap the crank arm lightly with a mallet.
- 3 . Re-tighten the flange nuts, and refit the dust caps.





Chain

Inspection

The chain must be kept clean, rust free and frequently lubricated in order to extend its life as long as possible. It will require replacing if it stretches, breaks or causes inefficient gear shifting. Make sure that there are no stiff links, they must all move freely.

Lubrication

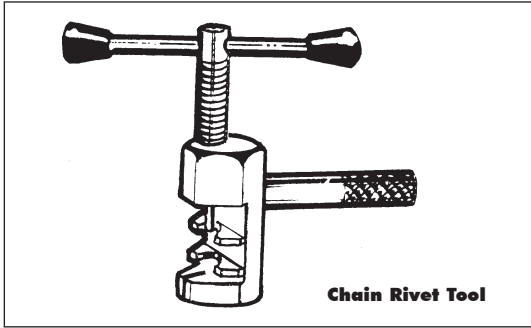
The chain should be lubricated with light oil at least every month, or after use in wet, muddy, or dusty conditions. Take care to wipe off excess oil, and not to get oil on the tyres or rim braking surfaces.

Adjustment and Replacement

On derailleur geared bicycles the rear derailleur automatically tensions the chain.

To adjust the chain on single speed freewheel, coaster hub braked or 3-speed hub geared bicycles:

- 1 . Loosen the rear axle nuts (and coaster brake arm clip if fitted) and move the wheel forward, to loosen, or backward, to tighten, in the frame.
- 2 . When correctly adjusted the chain should have approximately 10mm of vertical movement when checked in the centre between the chainwheel and rear sprocket. Centre the wheel in the frame and re-tighten the axle nuts after any adjustment. Bicycles which have a single speed freewheel, coaster hub brake or 3-speed hub, generally use a wider type chain than derailleur geared bicycles. These chains can be disconnected by way of a special joining link after prising off a U-shape plate on the master link with a screwdriver. To replace, feed the chain around the chainwheel and rear sprocket, fit the master link into the rollers into each end of the chain, position the master link side plate, and slip on the U-shaped snap-on plate. Make sure the open end of the U-shaped plate is trailing as the link approaches the chainwheel when pedalling forward.

**Chain Rivet Tool**

Derailleur geared bicycles use narrower chains and require a special tool to fit and remove, or to change the length.

To remove, fit the rivet tool so that the punch pin is centred over any one of the chain rivets. Push the rivet almost all the way out, then back out the punch and remove the tool. Holding the chain on both sides of the punched rivet, bend it slightly to release link from the rivet.

To install, feed chain around chainwheel, rear sprocket and derailleur cage with rivet facing away from the bicycle. Bring the two ends together within the special tool and punch the rivet into place. Be sure not to push rivet too far through side plate.

Some new types of chain do not require special tools to remove or replace. However these do use a special connecting link which should be renewed every time you disassemble the chain. Refer to the makers' special instructions when fitting this type of chain.

Freewheel

Inspection

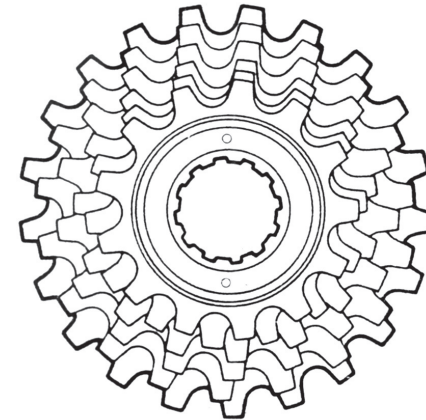
Like the chain, the freewheel must be kept clean and well lubricated.

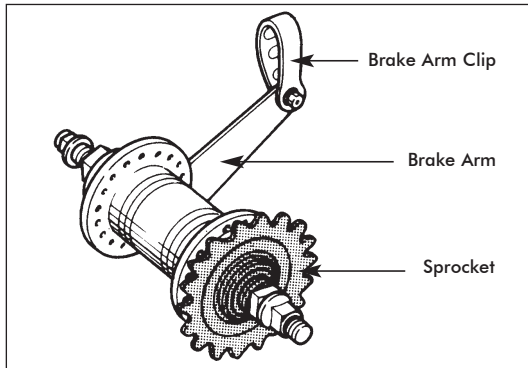
If the chain has become worn and needs replacing, then it is likely that the freewheel will also have become worn and should also be replaced.

Take the chain off the freewheel and rotate it with your hand. If you hear a grinding noise or the freewheel stops suddenly after spinning it, it may need adjustment or replacement. Such action is beyond the scope of this manual and you should consult a specialist dealer.

Lubrication

Remove any accumulated dirt from the freewheel with a brush and some kerosene. Disassembly of the free wheel is a complicated procedure requiring special tools, and should be left to a specialist dealer. Apply oil to the freewheel whenever you lubricate the chain, taking care to wipe off any excess.





Coaster Hub

Many BMX style and other children's bicycles are fitted with a Coaster Hub Brake in the rear wheel. This type of brake offers the advantages of reliability and easy operation. The brake is operated by applying back pedal pressure and allows the rider to "coast" without pedalling if desired.

There are several models of coaster hubs available, and the internal mechanisms are very complex. They require infrequent attention as far as lubrication, adjustment or replacement of internal parts, but this should be left to a specialist if needed.

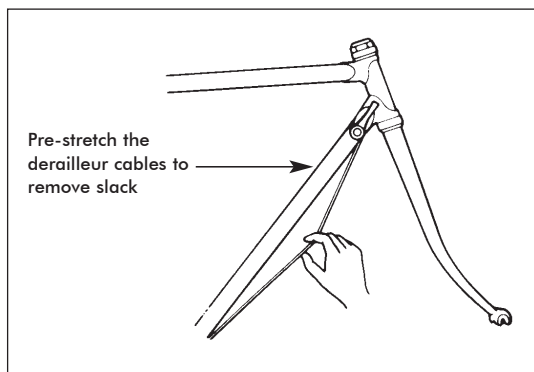
Keep the coaster hub sprocket clean and oil it along with the chain.



Make sure the brake arm is correctly attached to the chainstay with the brake arm clip. The brake will not operate otherwise.

DERAILLEUR SYSTEMS

The derailleur system comprises the front and rear derailleurs, the shift controls, and the derailleur control cables, all of which must function correctly for smooth gear shifting to occur. There are several different types of derailleur systems but all operate using similar principles. Your new bicycle may be fitted with a standard "friction" type system where you will need to feel each gear shift into position. It may be fitted with an "index" system (e.g. SIS) which links each different gear position to a positive click mechanism in the shifter, and makes shifting very simple and precise. On some bikes the shifting levers may be above or below the handlebar, have dual levers above and below the handlebar, or the shifting mechanism may even be incorporated into the hand grip. A further development of SIS is the fully integrated system (e.g. STI) where the shift lever and brake lever mechanisms form an integrated unit with the system allowing both gear shifting and braking to occur at the same time. More detailed information on installation and lubrication of specific systems should be supplied with your bike, otherwise please refer to a specialist bicycle mechanic.

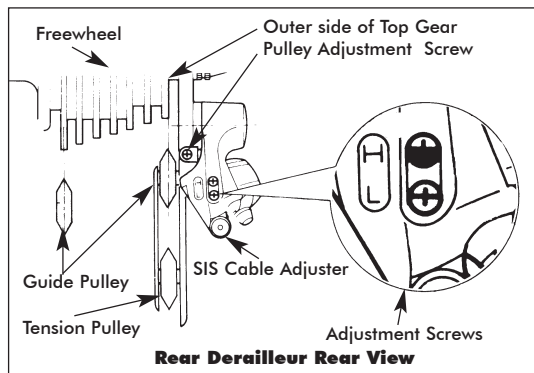


Inspection

The operation of the derailleur system should be checked at least every month. Check the operation of the rear derailleur first, then the front. The rear derailleur should shift the chain cleanly from one cog to the next without hesitation. On SIS equipped bicycles, each notched position in the shifter must equate to a new gear position. After shifting, the rear derailleur should not rub on the chain. The derailleur should never cause the chain to fall off the inner or outer freewheel cogs. The front derailleur should also shift the chain cleanly and without hesitation between each chainring. If your bicycle is equipped with front SIS, then each click or stop in the shifter should equate exactly to a new gear position. When the chain has been positioned onto a new chain ring, it should not rub on the front derailleur. The chain should not fall off a chainring at any time.

Derailleur control cables are a critical component that must be well maintained for accurate shifting performance. Check them for any sign of rust, fraying, kinks, broken strands, and any damage to the cable housing. If you find any problems, the cables may need replacing before you next ride.





Lubrication

All the pivoting points of the front and rear derailleurs should be lubricated with light oil at least every month. Be sure to wipe off any excess oil to prevent attraction of dirt into the mechanisms. The shifting cables should be cleaned and re-coated with a thin layer of grease every six months, or whenever new cables are being installed.

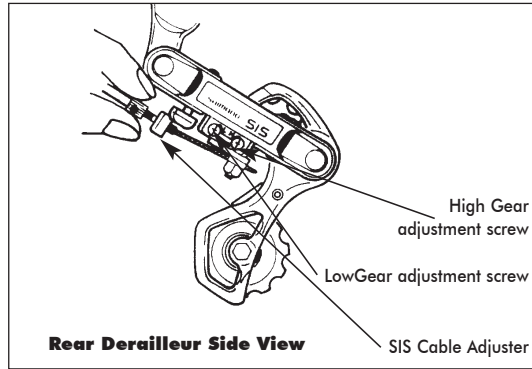
Adjustment - Rear Derailleur

The most commonly required gear adjustment on most current model bikes is a simple fine tuning of the SIS mechanism which is strongly related to gear cable tension. Find a way to lift the back wheel of your bicycle off the ground so you can turn the pedals forward.

To fine tune the SIS adjustment, make sure the shift lever is set on SIS mode and shift the chain from top to second gear. If the chain will not move to the second gear, turn the cable adjusting barrel counter-clockwise to increase the cable tension. If the chain moves past the second gear, turn the adjuster clockwise to decrease the tension. Next, pedal the cranks and with the chain still in second gear, turn the adjuster counter-clockwise to increase the inner cable tension. Stop turning the adjuster just before the chain makes noise against the third gear. This completes the adjustment.

If more detailed adjustment is needed, position yourself behind the bike so you can easily check the alignment of the chain, rear sprockets, and derailleur pulleys. Shift the chain to the smallest rear cog and the largest front chainwheel, and loosen the cable fixing bolt.

To adjust high gear, turn the adjustment screw marked 'H' until the top guide pulley lines up with the outside edge of the outermost sprocket. If the position of the guide pulley is set beyond the outside edge of the



sprocket, the chain will come off when pedalling. If the guide pulley is set too far toward the larger cogs, the chain wheel may not shift onto the small sprocket. Re-tighten the cable fixing bolt.

At this point the cable must be checked and adjusted to eliminate slackness with the right shifter all the way to the low position (fully forward for downtube shifters, fully back on MTB top bar shifters). If there is too much slack, loosen the cable fixing bolt, pull the cable taut, and re-tighten the bolt.

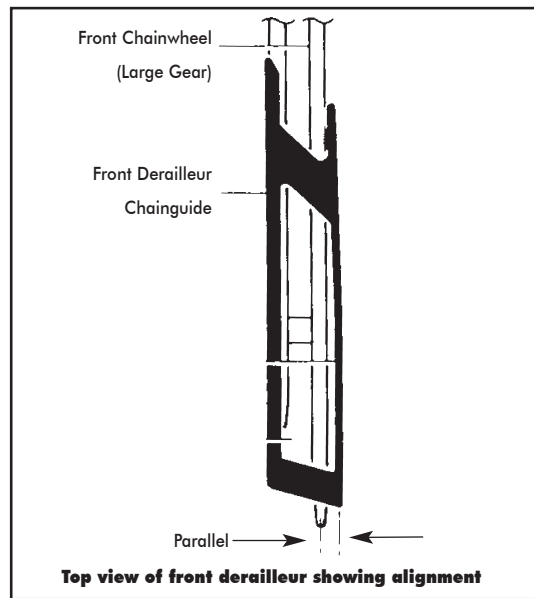
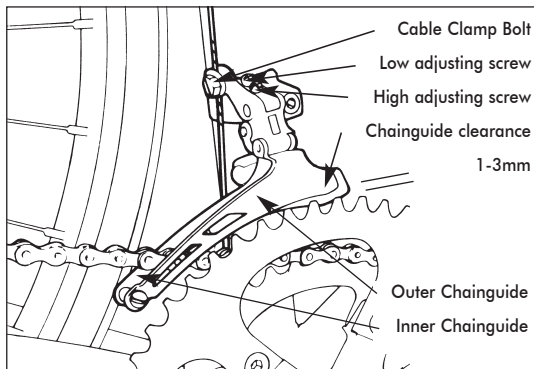
To adjust low gear, turn the adjustment screw marked 'L' far enough counter-clockwise so that you can shift the chain onto the largest rear sprocket and the smallest chainring. Move the shifter until the derailleur guide pulley and the sprocket are aligned. Turn the 'L' adjustment screw until it meets resistance. If the screw is turned in too far it will allow the derailleur to move outward and throw the chain off the sprocket when pedalling. If the adjustment prevents the derailleur moving far enough, the chain may not engage low gear.

Test the adjustment by shifting the chain rapidly up and down the freewheel. On bicycles equipped with indexed gears (SIS) the chain should move into each position without hesitation. If the chain won't move easily onto the large sprocket while on the small chainring, screw out the 'L' adjusting screw slightly. If the small sprocket is difficult to engage with the chain on the large chainwheel, screw out the 'H' adjusting screw slightly.

When adjusting SIS rear derailleurs there are some additional points to attend. Some derailleur models have an additional adjustment screw to set the guide pulley as close as possible to the sprocket. This is adjusted with the chain on the small cog and when set there must be no hint of rubbing noise or fouling when pedalling in reverse.

After a period of use, the derailleur cable will stretch and you may find difficulty shifting the chain to the large freewheel cog or the large chainwheel. If this occurs, re-adjust the cable either with the barrel adjuster or by repeating the above procedures.





Adjustment - Front Derailleur

The front derailleur must be positioned so that its chain guides are parallel to the chainrings. The outer chain guide should have a clearance of about 2-4mm above the large chainring when directly over it. Alter the derailleur position after loosening the clamp bolt.

To adjust low gear, shift the chain onto the smallest front chainring and the largest rear sprocket, and loosen off the control cable fixing bolt. Turn the adjusting screw marked 'L' until the inner cage just clears the chain.

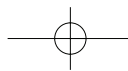
With the shift lever fully in the low position, pull the control cable taut and re-tighten the cable fixing bolt.

To adjust high gear, shift the chain to engage the smallest rear sprocket, and turn the adjusting screw marked 'H' so that the chain can be shifted to the largest chainring. Position the derailleur so that the inside of the outer cage just clears the chain by turning the 'H' adjusting screw further.

Test the gears in all possible front and rear chain positions. If the chain rubs against the cage when on the inner or outer chainring in any rear sprocket position, then turn the appropriate adjusting screw counter-clockwise. If the chain falls off either the inner or outer chainring, turn the appropriate adjusting screw clockwise. If the chain will not shift onto either the inner or outer chainring, turn the appropriate adjusting screw counter-clockwise.

To fine tune the adjustment on MTB bicycles fitted with front SIS, shift the chain to the largest rear sprocket and the largest front chainring. Shift from the largest to the middle chainring. Turn the cable adjusting barrel, located in the shifter, so that the inner chainguide just clears the chain. This should complete the adjustment so that the chain can shift cleanly, without hesitation between each chainring.

Fine tuning on racing style bicycles fitted with dual control (STI) levers is done by first shifting the chain to the largest rear sprocket and the largest

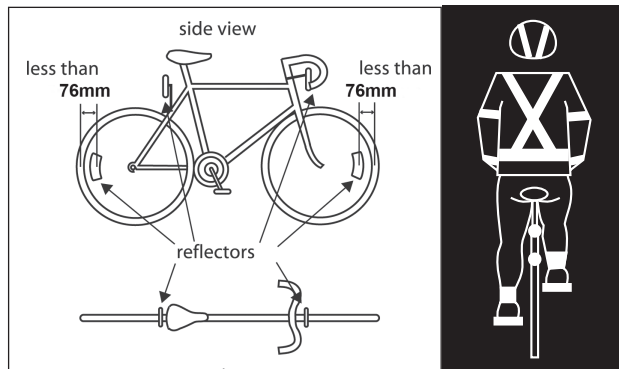


Adjustment - Front Derailleur (cont)

chaining. Next, push the left hand inner lever lightly to engage noise prevention mechanism.

Then turn the downtube mounted cable adjuster so that the inner chainguide just clears the chain. This completes the adjustment.

After a period of use, the front derailleur cable will stretch and you may find difficulty shifting the chain to the small chainring. If this occurs, loosen the cable fixing bolt and re-tension the cable.



REFLECTORS

Your bicycle is supplied with one white (front), one red (rear), and two orange (wheel) reflectors. In addition each pedal has two orange reflectors.

These are an important safety and legal requirement, and they should remain securely fitted and in good, clean condition at all. If bike is purchased in a carton, partially assembled, you may have to attach the front and rear reflectors and their mounting brackets using the screws, washers and other hardware provided. The exact mounting procedure will depend on the components supplied and may vary depending on the model. Note, if bike is supplied with a

front caliper brake, this must first be removed from the bike after undoing the hex nut at rear of fork. The reflector bracket must be mounted onto the caliper bolt **BEHIND** the caliper **NOT** in front.

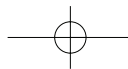
Front and rear reflectors should be aligned vertically, and wheel reflectors should be fixed opposite the valve within 76mm of the rim. Reflectors should always be used in conjunction with powered lighting when riding at night. Reflective tape on your clothing is also suggested to increase rider visibility at night.



WARNING: Do not remove the reflectors or reflector mounting brackets from your bicycle. They are an integral part of the bicycle's safety system. Removing the reflectors may reduce your visibility to others using the roadway. Being struck by other vehicles often results in serious injury or death.



WARNING: Reflectors are not a substitute for proper lights. Riding at dawn, at dusk, at night or at any other times of poor visibility without a bicycle lighting system which meets local and state laws and without reflectors is dangerous and may result in serious injury or death.





ACCESSORIES

There are a wide variety of accessories available that can enhance your bicycle's function, safety, versatility and style. If you are purchasing accessories, always make sure they are suitable for your bicycle. Be sure that they are correctly fitted and do not interfere with your ability to safely control your bicycle. Following is a list of some of the many kinds of accessories available for bicycles.

1 . Rear Carrier

Available in many styles and sizes, they allow you to safely carry your luggage. Luggage should only be carried on a properly designed and fitted bicycle luggage carrier.

2 . Pannier Bags

Versatile carry bags that usually fit either side of a rear mounted carrier. Several weather resistant compartments make them very useful for bicycle touring when you need to carry extra gear and keep it dry.

3 . Saddle Bag

These are useful for carrying small items such as tools, a spare tube or a puncture kit. Other small bags available are designed to fit on the handlebars, or in the corner of the main frame where they double as a shoulder pad if carrying the bicycle.

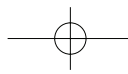
4 . Child Safety Carrier

The only way to carry children up to approximately 18kg in weight is in a properly designed carry seat.

These should be firmly attached to the bicycle, be fitted with a restraining harness, support the child and not allow access to the spokes of the turning rear wheel.

5 . Lights

Bicycle lights should always be used when riding at night or in other low light conditions. There are many kinds available. Some are powered by a dynamo generator, others are battery operated and are able to operate while the bicycle is not moving. Battery powered lights are often easily removable and front lights can double as a flashlight. Front lights must have a white beam. Rear lights must have a red beam; they often have a flashing mode which makes them highly visible to other road users. Lights should always be used in conjunction with your bicycle's fitted reflectors. Before riding make sure batteries are properly charged and dynamo power cables are properly connected.



6 . Safety Flag

Usually available in bright fluoro colours, these attach to the rear axle and make you more visible when riding in traffic.

7 . Pump

Essential for maintaining your tyres at their correct pressure. Make sure the end connection is the same as valves on your bicycle's tubes.

8 . Repair Kit

You'll need one of these to help get you mobile again in the event of a tyre puncture.

9 . Lock

Your new bicycle is an expensive item which you would not like to lose through theft. There are many kinds of bicycle locks available, some more effective than others. Always lock your bicycle to an immovable object if you leave it unattended.

10 . Rear View Mirror

A very useful item to keep you aware of traffic moving behind you.

11 . Bar Ends

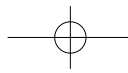
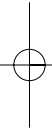
These can be attached to the ends of Mountain Bicycle handlebars to give you added flexibility in hand positioning, especially when hill climbing.

12 . Computer

Better than a simple speedometer, bicycle computers come with a number of functions so you can measure your speed, distance travelled and time. They are a very useful aid for fitness training.

13 . Mudguards

Prevent road dirt and water from soiling your clothes and getting in your eyes.





14 . Water Bottles

When riding in hot weather you'll need to increase your body's liquid intake. Bicycle water bottles are available in attractive fashion colours in various sizes and are conveniently carried in frame mounted carry cages.

15 . Gloves

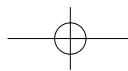
Bicycle gloves help prevent soreness and blisters on your hands during long rides and also give protection in the event of a fall. They are available in a variety of great looking fashion colours and designs.



Cycling requires a certain amount of skill and concentration to ride safely and in control. While fitting accessories to your bike can add enjoyment to your cycling experience, it is strongly recommended that any adjustments or actions that would change your normal riding position should be avoided, as the slightest of accidents which could occur can still cause injury.

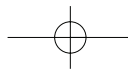
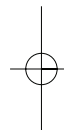
Some of these actions may be as simple as helmet adjustment, changing mode on your cycle computer, reaching into a saddle bag or pannier for a ringing mobile phone, mirror or light adjustments or simply reaching for your water bottle. All of these actions should be carried out while you and your bike are stationary and moved to the side of the road, path or trail.

By obeying the road laws, riding safely and in control, your riding experience will be enjoyable and incident free.



TROUBLESHOOTING

Problem	Possible Cause	Usual Remedy
Gear shifts not working properly	Derailleur cables sticking/stretched/damaged Front or rear derailleur not adjusted properly Indexed shifting not adjusted properly Front derailleur not correctly aligned	Lubricate/tighten/replace cables Adjust derailleurs Adjust indexing Loosen mounting nut and re-align
Slipping chain	Excessively worn/chipped chainring or freewheel sprocket teeth Chain worn/stretched Stiff link in chain Non compatible chain/chainring/freewheel	Replace chainring, sprockets and chain Replace chain Lubricate or replace link Seek advice at a bicycle shop
Chain jumping off freewheel sprocket or chainring	Chainring out of true Chainring loose Chainring teeth bent or broken Rear or front derailleur side-to-side travel out of adjustment	Re-true if possible, or replace Tighten mounting bolts Repair or replace chainring/set Adjust derailleur travel
Constant clicking noises when pedalling	Stiff chain link Loose pedal axle/bearings Loose bottom bracket axle/bearings Bent bottom bracket or pedal axle Loosen crankset	Lubricate chain Adjust bearings/axle nut Adjust bottom bracket Replace bottom bracket axle or pedals Tighten crank bolts
Grinding noise when pedalling	Pedal bearings too tight Bottom bracket bearings too tight Chain fouling derailleurs Derailleur jockey wheels dirty/binding	Adjust bearings Adjust bearings Adjust chain line Clean and lubricate jockey wheels
Freewheel does not freewheel	Freewheel internal pawl pins are jammed	Lubricate. If problem persists, replace freewheel
Brakes not working effectively	Brake blocks worn down Brake blocks/rim greasy, wet or dirty Brake cables are binding/stretched/damaged Brake levers are binding Brakes out of adjustment	Replace brake blocks Clean blocks and rim Clean/adjust/replace cables Adjust brake levers Centre brakes





Problem

When applying the brakes they squeal/squeak

Knocking or shuddering when applying brakes

Wobbling wheel

Steering not accurate

Frequent punctures

Suspension dampers binding

Knocking from rear end of suspension model

Possible Cause

Brake blocks worn down
Brake block toe-in incorrect
Brake blocks/rim dirty or wet
Brake arms loose

Bulge in the rim or rim out of true
Brake mounting bolts loose
Brakes out of adjustment

Forks loose in head tube

Axle broken
Wheel out of true
Hub cones loose
Headset binding
Hub bearings collapsed

Wheels not aligned in frame
Headset loose or binding
Front forks or frame bent

Inner tube old or faulty
Tyre tread/casing worn
Tyre unsuited to rim
Tyre not checked after previous puncture
Tyre pressure too low
Spoke protruding into rim

Loss of internal fluid
Internal rust
Damaged internal parts

Broken suspension mount
Worn suspension bushing

Usual Remedy

Replace blocks
Correct block toe-in
Clean blocks and rim
Tighten mounting bolts

True wheel or take to a bike shop for repair
Tighten bolts
Centre brakes and/or adjust brake block toe-in
Tighten headset

Replace axle
True wheel
Adjust hub bearings
Adjust headset
Replace bearings

Align wheels correctly
Adjust/tighten headset
Take bike to a bike shop for frame realignment

Replace inner tube
Replace tyre
Replace with correct tyre
Remove sharp object embedded in tyre
Correct tyre pressure
File down spoke

Lubricate as required
Disassemble damper and replace damaged parts
Refer to specialist mechanic

Repair/replace frame
Replace worn components