BROMPTON BICYCLE - OWNER'S MANUAL

INTRODUCTION:

Before using your Brompton, we recommend you read the sections on safety and folding. You should also be aware how important it is to keep your tyres well pumped-up: soft tyres make for a lot more pedalling effort (which takes much of the fun out of riding), wear out quickly, and also have an adverse effect on handling. We cannot overemphasise the need to keep tyres well inflated.

If you carry out any adjustments or maintenance work yourself, do read the relevant section of this manual first, as it's quite easy to get things wrong, and to impair the folding process or damage the machine. If you take your bike to a dealer for any servicing work, wherever possible use an authorised Brompton stockist.

Serial and Frame Numbers. The label at the back of the seat tube on the main frame carries the serial number. The frame number is stamped on the main frame just forward of the rear suspension pivot: it's a good idea to keep a record of both numbers. The serial number will be useful if you have any maintenance or technical queries.

CONTENTS

BROMPTON

SECTION A: SAFETY.

1. Before riding, see that the seat pillar clamp is properly secured, and that the hinge clamp levers are firmly screwed up.

2. Carrying the Brompton: it is obviously less critical that the bike is correctly folded than assembled, but bear in mind that, if the machine has not been properly locked together, unexpected unfolding of the folded package, for instance on a staircase or lifting it off a luggage rack, could cause injury.

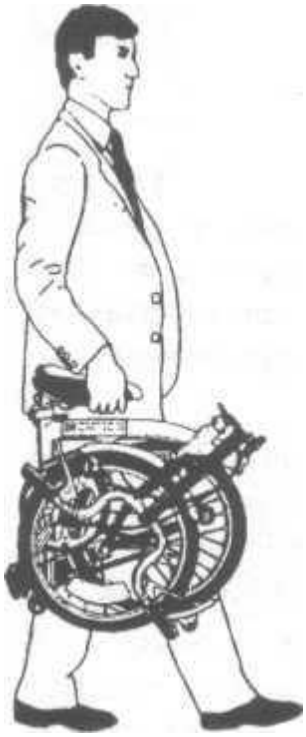
3. Do NOT try to alter the height of the handlebar stem where it enters the front forks.

4. Keep the gears properly adjusted, and brakes and control cables in good condition. Running adjustments should be carried out as described in section G.

5. During folding and unfolding, avoid putting your hands anywhere that they may be trapped.

6. High mileage and hard riding: aluminium alloy is used on the Brompton and this has a limited fatigue life. *Failure in use can cause injury*, so follow the recommendations in section K regarding routine replacements of ALLOY components of the bike.

7. The Brompton is for use on roads and well made paths. It is not designed for cross country riding: this can overstress the frame, and anyway the tyres and wheels are quite unsuitable.



8. When riding on fine grit, or on wet surfaces, the 16" tyres have less grip: wet metal (such as a man-hole cover) is particularly slippery. Also, in rain the brakes may be less effective. Take due care.

9. Use lights, front and rear, when riding after dark.

SECTION B: FOLDING AND UNFOLDING.

If you have not had the Brompton demonstrated or explained to you, read this section before trying to unfold or fold the bike. For those who are already familiar with the Brompton, part 3 may be a useful source of tips.

Part 1: *ORDER* OF UNFOLDING & FOLDING - OVERVIEW.

a) UNFOLDING:

Stage 1: raise ***saddle & handlebar*** and (if a folding pedal is fitted) unfold ***pedal***: these items can be dealt with in any order, but they must be unfolded before moving on to stage 2.

Stage 2: unfold ***front wheel***. The bicycle is now in its "parked" position and ready for use.

b) FOLDING:

Always "park" the bike by swinging the rear wheel under before folding:

Stage 1: fold back ***front wheel*** (right hand pedal should be moved out of the way if necessary).

Stage 2: lower ***handlebar & saddle*** and, if fitted, stow folding ***pedal***; again, these items can be dealt with in any order once the front wheel has been folded back and latched onto the rear frame.

Part 2: OTHER POINTS TO REMEMBER.

1. *The seat pillar, when folded, is what locks the folded package together:* it projects down from the main frame, so preventing the rear frame from rotating. So, if the seat pillar is projecting below the main frame, DON'T try to park or unpark the Brompton: also DON'T try to latch or unlatch the front wheel from the rear frame, as this requires that the rear frame rotates relative the main frame. Also if the saddle is not fully down, the folded package may fall apart when you pick the bike up.

2. The folded bicycle can be carried by the main tube. Alternatively grip the front of the saddle, but to do this a) re-clamp the seat pillar after folding (best with the saddle pointing slightly rightwards, over the centre of gravity), and b) avoid pulling the padding away from the saddle frame.

3. Turning the cranks/pedals when the bicycle is parked:

a) the left hand pedal should not be folded when turning the cranks, as it can catch on parts of the rear frame;

b) during folding, the right hand pedal may have to be moved: to do this, the cranks can be rotated forwards or backwards. However, when new, particularly in top gear, turning the cranks quickly backwards can cause the chain to go slack or even come off. If this happens, turn the pedals forward instead, or alternatively keep the bike in middle gear when folding.

Part 3: UNFOLDING AND FOLDING EXPLAINED IN DETAIL.

If you have not seen the Brompton being folded, you may get the impression on reading this section that the process is difficult: it involves in practice only a few easy movements.

UNFOLDING, stage 1 - Saddle & Handlebars (and folding pedal):

Saddle, fig FS1. Undo the quick release lever, QR, under the saddle (swing it outwards and backwards). Grip the saddle at the rear end, and, resting one hand on the main frame tube near M, draw the saddle upwards until it comes to a stop: get the saddle pointing straight ahead, and do up the lever QR (it should lie alongside the main frame). In order to obtain a smooth action when moving the saddle up or down, you should pull or push along the line of the seat pillar itself. If you need a saddle height higher than normal, see section D.

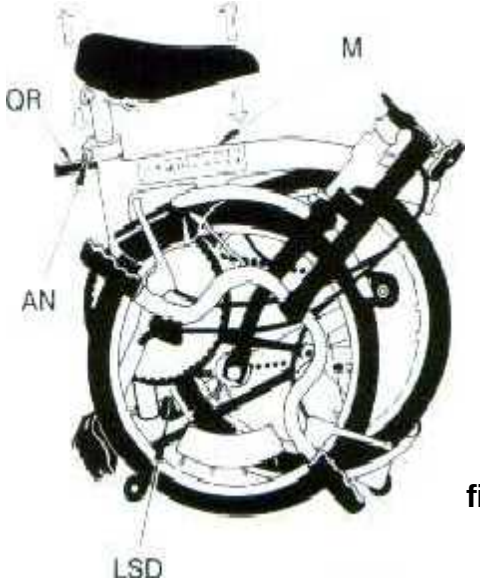


fig. FS1

Handlebar, fig FS2. The handlebar assembly is kept folded by the nipple, HBNIP, being trapped in the clip, HBC. To release, pull the handlebar outwards and forwards and swing it round and up. To secure, make sure that the hinge clamp plate, HCPL, straddles both hinge plates, and screw up the lever at HH, firmly.

fig. FS2

Left Hand pedal, fig FS3. If this is fitted, unfold it by swinging the pedal body, PB, outwards. The latch plate, LP, will snap into position to lock the pedal in place.

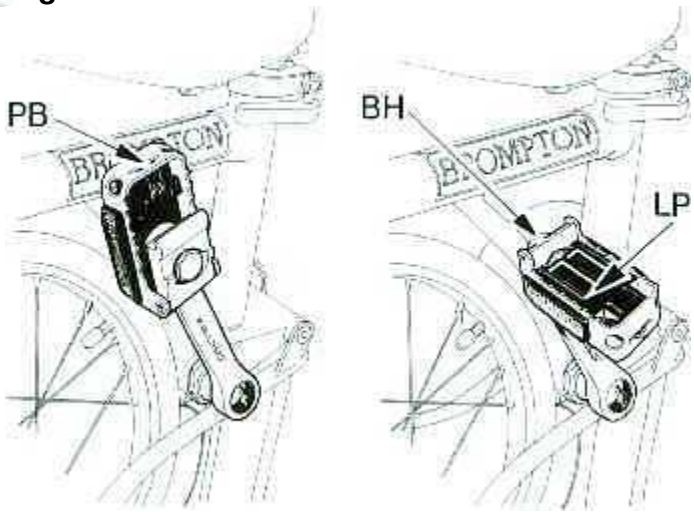


fig. FS3

UNFOLDING stage 2 - Front wheel, figures FS4 & 5:

Do not attempt to unfold the front wheel assembly if either the saddle or the handlebar is still folded.

Unfolding or folding the front wheel requires only a single action, described below: however, it's a help to understand what goes on. The front wheel/fork is held in place when folded by means of the hook, H, passing over the tube, CHS, on the rear frame. To release, the whole bicycle must be tipped slightly back relative to the rear wheel underneath it, so that the hook clears the tube, fig FS4. The front wheel is then moved out and forward into position:
during this action there is no need to turn the front wheel - it should be kept pointing forward (and slightly leftwards), fig FS5. Also you should note that during this action the top of the handlebar assembly remains roughly in the same position, with the bottom moving round a small half circle.

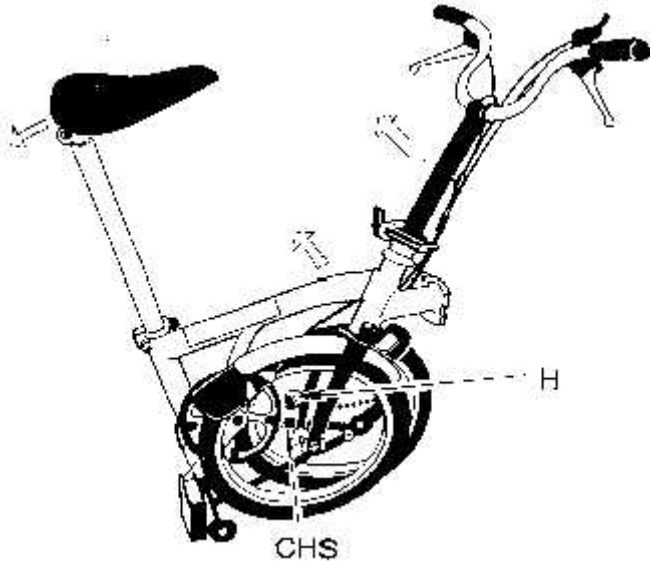


fig. FS4

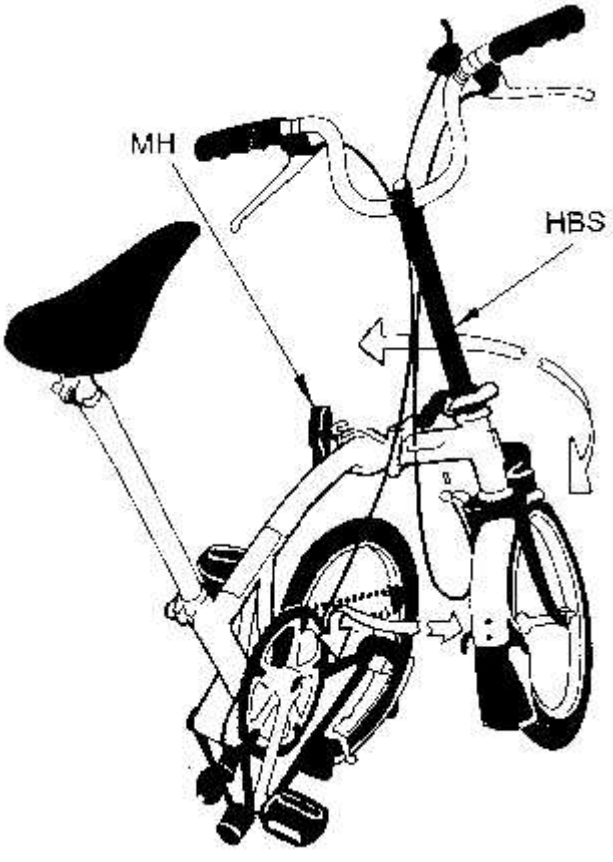


fig. FS5

You will find that there is a variety of methods for carrying out this action, but to begin with try the following: grasp the handlebar support, HBS, lift it slightly (maybe lifting the main frame or pushing back on the saddle at the same time), and then, using a "stirring" action move the front wheel out and round to its unfolded position. No strength is needed for this, but if you find the action awkward to begin with, take hold of the front mudguard with your other hand and help the wheel round and forward. Finally, do up the hinge clamp on the main frame at MH, securing the lever firmly (leaning the bike to the right helps keep the locking plate in place whilst doing this).

The bicycle is now parked, in effect ready for use: to unpark (fig FS6), lift the bike by the saddle (keeping the front wheel turned slightly leftwards) and allow the rear frame/wheel to rotate down and back into its unfolded position. By controlling the way in which you raise and lower the saddle, this can be done in a single smooth movement: if to begin with you find the wheel hanging in the halfway position, help the wheel round by hand or with your foot. There is no need to lock the rear wheel assembly, as your weight, when you are on the bike, keeps it in place.

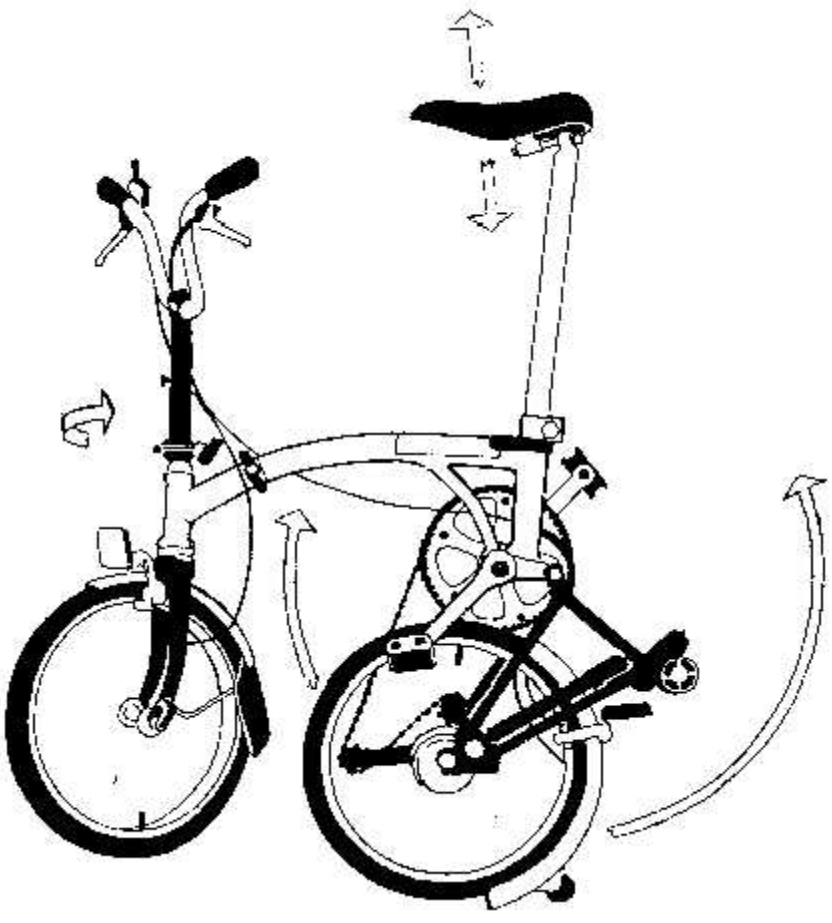


fig. FS6

FOLDING: stage 1 - Front wheel, fig FS5:

Always start by parking the bike, fig FS6: to do this, turn the front wheel slightly leftwards (if you don't, no harm would result, but the rear wheel would clash with the front wheel) and then raise the bike by the saddle, so allowing the rear wheel to swing down and forward to lie under the main frame. The bike is now parked, and providing it is on reasonably level ground will stand up unsupported.

It is tempting to start folding with the "easy" items, the seat or handlebars. The bike cannot be folded properly if you do start with these: *you must fold back the front wheel/fork FIRST.*

Have the right hand pedal out of the way of the front wheel: best if the right hand pedal ends up pointing backwards and downwards.

Unscrew the hinge clamp at MH on the main frame (three or four turns of the handle normally suffice). Grip the handlebar support, HBS, lift slightly (maybe pushing back on the saddle at the same time) and, keeping the front wheel pointing forwards, use a "stirring" action to move it out and back round till it lies alongside the rear wheel (again no strength is needed for

this, but if it helps, take hold of the front mudguard with your other hand and guide the wheel round). Make sure that the hook, H, has passed over the tube, CHS, on the rear frame, and allow the front wheel assembly to drop (the whole bike actually rotating relative the rear frame). With the front wheel now folded, you can move on to the other parts.

FOLDING stage 2 - Handlebars and Saddle (and folding pedal):

Handlebar, fig FS2. Undo the hinge clamp at HH (handlebar stem). Swing the handlebars down to lie alongside the front wheel, and push home so that the nipple, HBNIP, engages in the clip, HBC: alternatively, simply let the handlebars drop into position on their own.

Saddle, fig FS1. Undo the lever, QR, push the saddle right down, and re-clamp the lever. During this action, the lower end of the seat pillar passes behind the plastic disc, LSD, on the rear frame: it is because of this that the rear frame remains folded, in turn retaining the front wheel in its folded position. So if you do not push the saddle fully down, it is possible for the folded package to come apart when you pick the bike up.*Folding pedal, fig FS3*. It is best to fold this with the left hand crank as high as possible (i.e. with the cranks turned so that the right hand pedal touches the front wheel): also, the ridged side of the nylon latch plate on the pedal should face upwards. Press the outer part of the latch plate downwards, so that the inner part clears the top of the bearing housing, BH, and stow the pedal PB.

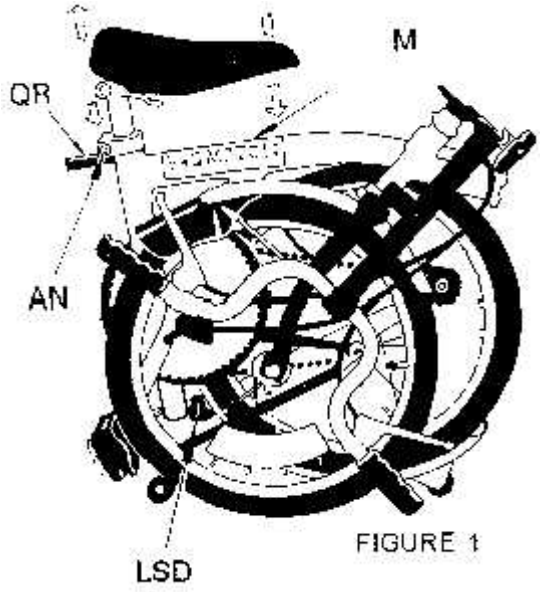


FIGURE 1

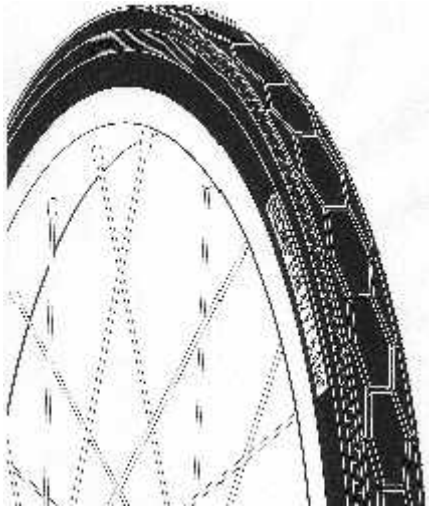
Front wheel assembly, other methods for folding and unfolding: the method described above, viz. holding the handlebar support and using a stirring action to move the front wheel assembly, is perfectly satisfactory. However, if you frequently fold and unfold your Brompton, you'll become aware of other, easier, techniques for this stage of folding.

SECTION C: USING THE BROMPTON.

1. Tyre pressures:

	BROMPTON high-pressure:		**Record (C-type, see note):**	
	Recommended	Maximum	Recommended	Maximum
FRONT	60 – 80 psi	100 psi	50 – 70 psi	75 psi
REAR	70 - 90 psi	100 psi	60 – 70 psi	75 psi

(Note: on the Raleigh Record tyres it is safe, because of the rim profile on the Brompton, to use 75 psi max. instead of the 55 psi marked on the tyre.)



The most appropriate pressure depends on your weight and preference. On rough roads, it's obviously more comfortable if you keep the pressures near the lower end of the ranges. However, for minimum pedalling effort, use the higher pressures.

With lower tyre pressures, the pedalling effort rapidly increases, and the risk of punctures is higher: KEEP YOUR TYRES WELL INFLATED.

A car-type valve is used, allowing various methods of inflation. The Brompton HP pump is well suited, and can be kept on the rear frame. You can also use a standard car foot- or hand-pump, or an air line: with compressed air, say at a garage, the pressure in the tyre will rise very quickly: so let the air enter in short bursts, checking the pressure all the time. If you use a standard bike pump with a flexible connector, you have to unscrew the connector very swiftly to avoid air loss.

2. Gears:

Two gear systems are used on Bromptons, derailleur (left hand trigger) and hub gears (right hand trigger). To keep things simple, follow two rules for changing gear:

a) ***when moving***, keep pedalling, but take the pressure off the pedals while making the change, and

b) ***when stationary***, avoid using the left hand trigger, and for the right hand trigger, back pedal a little to allow the new ratio to engage (if, when pulling

the lever on the RH control down, you encounter unusual resistance, do not force the control: instead, back pedal and try again).

Always make sure that the hub gear-control lever clicks positively into place (and is not left in an "in-between" position). And if your bike has a derailleur, do not neglect to use it: if you use only one sprocket all the time, the wear will be uneven.

If transmission is not smooth in any gear, take action to remedy this, as damage could result. Adjustments of the gear control(s) will be needed from time to time, particularly during early use: see section G.

3. Operating the dynamo on the T-type.

To engage the dynamo against the tyre, either, if the dynamo is fitted with a lever, depress the lever, or, if there is no lever, push the body of the dynamo down relative to its bracket. To release the dynamo, pull the body of the dynamo away from the tyre, and the dynamo will latch off

4. Fitting luggage to the front carrier block.

The front carrier frame has an integral tapered latch plate. To attach the frame, slide this plate down onto the front of the carrier block: you will hear a distinct click as the frame approaches its rest position, an indication that the sprung latch lever in the carrier block has engaged. To remove luggage, pull the bottom of the latch lever backwards (this projects underneath the carrier block, just above the front brake), and then draw the frame upwards and off: a slight side to side rocking action may be needed to free the luggage from the block

5. Parking the Brompton.

When you first start using the Brompton, you may be put off by the way the rear wheel falls away whenever you pick the bike up. However, this feature allows you to park the bike instantly, a great convenience.

When wheeling the bike up on to a curb, the rear wheel assembly may tend to start folding, particularly when you have a load on the bike. You can normally prevent this by lightly applying the rear brake.

If you wish to do without the Brompton's parking feature, preferring the rear wheel assembly to stay put, tie an elasticated cord round the base of the seat pillar: it is often worth doing this when carrying loads on the rear rack.

6. Carrying the unfolded bike.

Now and again, for instance to climb a set of steps, you may wish to carry the Brompton without folding it up. To prevent the rear frame from folding, you need to use two hands, one holding the rear end: but without luggage at the rear, you can pick the bike up with one hand by the main frame and let the rear end hang down.

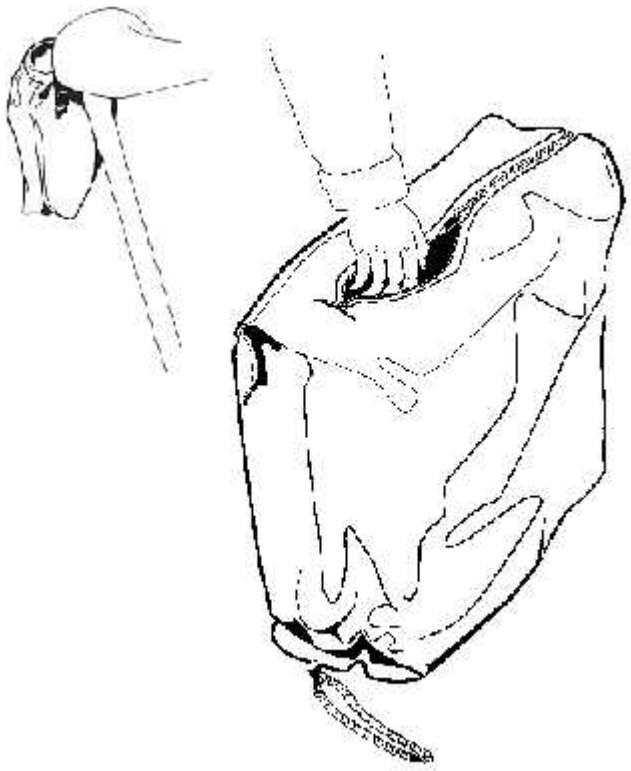
7. Wheeling the folded bike around.

The folded Brompton can be pushed into tight spaces on its rollers. You can also pull it around with you, using the raised handlebar as a handle: this is useful over relatively short distances, for instance along a station platform, but it isn't practical for longer distances or on uneven ground (when it pays to unfold the machine).

8. Using the cover.

The cover comes with a saddlebag for storage when it's not in use. If you don't use the saddlebag for the cover, you may find it useful as a container for other small items.

The zip on the cover helps fitting, and allows access at the top for carrying the bike. If you wish to make a neater package and also partially to cover the base of the bike, pull the lower edge of the cover right down, and then draw the pull cord tight.



SECTION D: SADDLE POSITION.

If folded size is critical (and you are happy with the saddle nearer to the handlebars) then, for maximum compactness, fit a saddle adaptor pin, pointing "downwards".

With the saddle mounted in any other way, it ends up projecting somewhat from the minimum folded envelope.

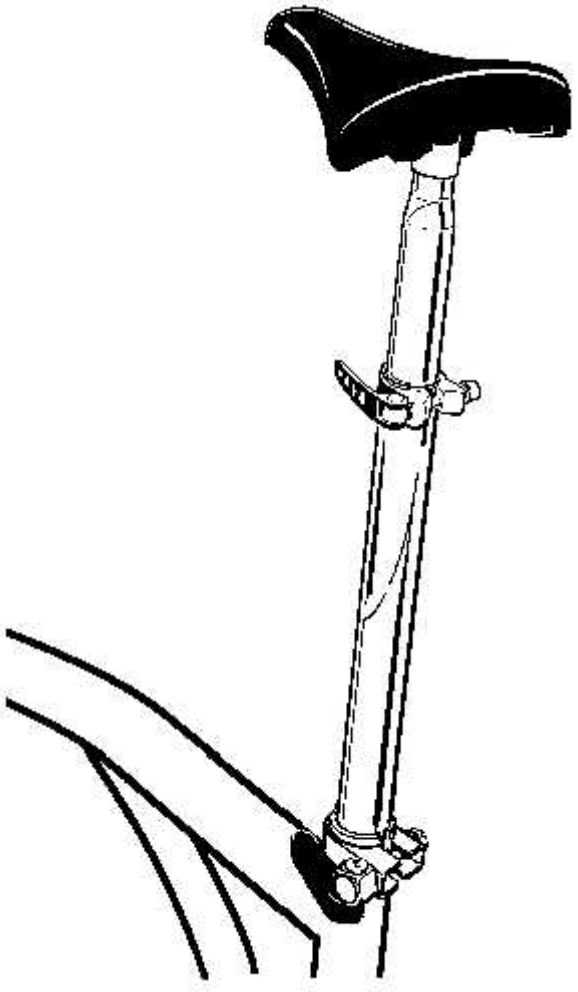
BASIC ADJUSTMENTS:

Height of the saddle: for the maximum height, draw the seat pillar up until it reaches a positive stop (and for lower positions slide it down). If you wish to select a very low position, take care, as the bottom of the seat pillar may project below the main frame and prevent the rear frame from swinging between parked and un-parked positions.

Saddle angle is adjusted in the normal way (slacken the nut securing the mounting clip, choose a suitable angle and re-tighten the nut: torque 13NM).

The saddle can be moved 30mm back by reversing its clip so that the seat pillar passes forward of the bolt.

ADDITIONAL HEIGHT:
Riding with a saddle even slightly too low is no fun. You can win around 15mm of extra height by moving the saddle-clamp up the seat pillar itself, and this might be sufficient. If not, there are three Brompton options which allow more height, extended seat pillar, telescopic seat pillar, or saddle adaptor pin pointing "up": see Section M for details. Alternatively, use another design of saddle, with greater depth.
Note: if you do opt for a saddle adaptor pin, don't mount it pointing backwards as this could produce stresses for which the bicycle is not designed.



SECTION E: HANDLEBAR & CONTROL POSITIONS.

The handlebars and control levers on the Brompton are factory set to provide a compromise between compactness and riding comfort: for most users the riding position should be fine.

There is no vertical adjustment (see below), but there is some adjustment available in the fore/aft direction. You should be aware that if you do choose to make such an adjustment, then the folded handlebar will not lie as close to the front wheel as normal.

Handlebars or levers moved FORWARD: these will hit against the front wheel on folding, and so prevent the handlebar catch from functioning properly: adjust the handlebar nipple as described in section H.

UNDER NO CIRCUMSTANCES should you attempt to set the handlebar at a higher position by withdrawing the lower part of the handlebar stem from the steerer tube on the front forks.

If the handlebar stem assembly has to be moved for any reason, then, on reassembly, a) leave a gap of 0.5mm-1.5mm between the top of the steering locknut and the step in the stem under the hinge, b) use a tightening torque of 20NM for the expander bolt (whose 6mm AF socket head is visible when the handlebar is folded), and c) check the alignment of the handlebar catch (section H).

SECTION F: WHEELS, REMOVING AND REFITTING.

If the brakes are properly adjusted and the tyre is well inflated when removing or fitting a wheel, you won't be able to move the tyre past the brake pads. One way round this is to deflate the tyre: alternatively, loosen the cable adjustor (if it's possible) or remove a brake pad.

Front wheel.

To remove, undo and remove the nut and washer on the left hand end of the axle, move the hook (and mudguard stay) out of the way, and detach the special LH tab washer. Slacken the RH nut, disengage the tab washer and remove the wheel (see note below).

To replace, follow the above in reverse, making sure that each tab washer engages the hole near the fork end, and that the axle remains seated against the end of each slot while you tighten the wheel nuts: torque 15NM.

Notes:

1. If the front wheel has not been removed for some time, you may find, on undoing the second of the two nuts that the axle starts to turn with the nut so that the nut cannot be slackened off. If this happens, re-tighten both nuts, then slacken and retighten the right hand nut a few times till it turns easily on the axle; partially re-tighten this nut and then slacken the left hand nut, and finally undo the RH nut again.

2. The LH tab washer is special: do not swap it with the RH tab washer.

Rear wheel.

Move the gear trigger(s) up to high gear and, in order to engage the high gear(s), move the pedals forward and backwards. Park the bike.

Removing the chain tensioner, fig AR3.

For a hub gear, the control has to be disconnected: press the spring clip C on the adjustor A, and withdraw it from the end B of the gear indicator; the indicator chain GICH will be left hanging loose from the end of the axle and should be unscrewed from the hub and withdrawn.

Move the sprung arm, CTARM, anti-clockwise and lift the chain off: allow the CTARM to move back clockwise until it comes to a stop; undo the securing nut CTN and remove it together with its washer. The chain tensioner assembly may now be removed by drawing it sideways, off the end of the axle (if a derailleur is fitted, it has to be tilted to clear the changer).

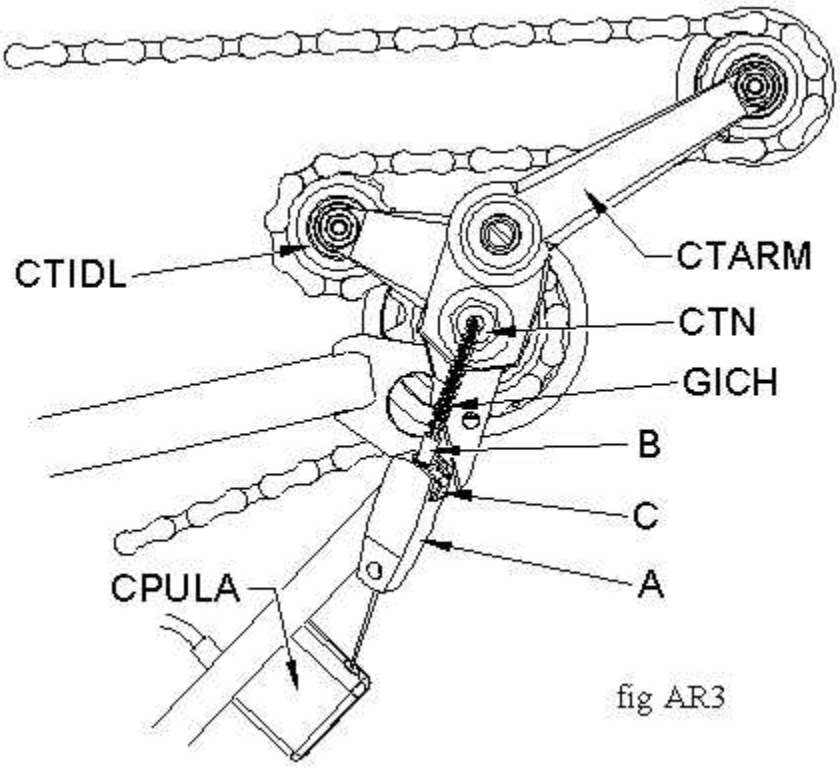


fig AR3

Removing the wheel, fig AR4.

Slacken the axle mounting nuts. For hub gears at least 4 or 5 turns are needed, so that the tab-washers TA can disengage from their slots, SL2: you may need to prise these tab-washers out with a small screw-driver.

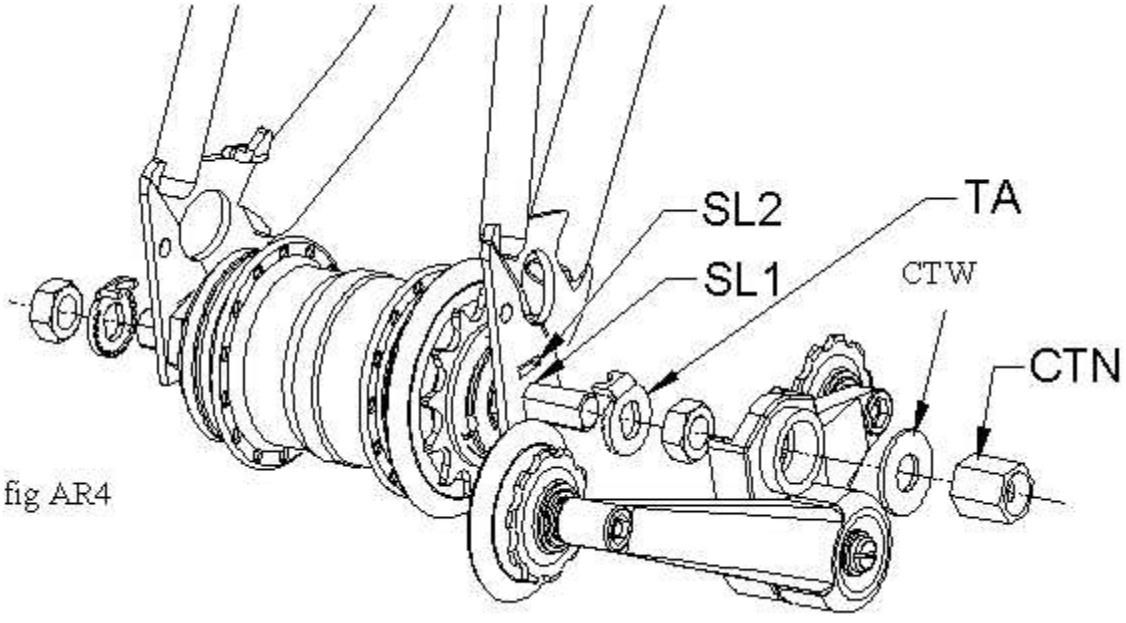


fig AR4

Fitting the wheel.

Make sure that the chain passes round the rear sprocket. Drop the axle into the slots, with any tab-washers TA the correct way round (i.e. tabs aligned with slots SL2). Make sure that the axle is seated, at each end, against the end of the slot, SL1, and do up the wheel nuts, torque 22NM.

Fitting the chain tensioner:

First arrange the chain so that it is running true over both chainwheel and rear sprocket (for a derailleur, the outer sprocket); next note that the chain tensioner body has two flanges on its inner face - these should pass either side of the axle plate when fitting the chain tensioner.

For a non-derailleur bike, address the chain tensioner to the axle plate and press home, making sure that the chain passes between the fixed idler sprocket CTIDL and the rear sprocket.

For a derailleur bike, the chain and the fixed idler on the chain-tensioner-base, CTIDLB, have to lie between the "uprights" of the chain-pusher-plate. So, with the LH trigger up and the chain-tensioner inclined slightly outwards as in fig DR14 (chain not shown in this figure), feed the idler CTIDLB between these uprights, and then feed the chain-tensioner base onto the rear axle plate till it abuts squarely.

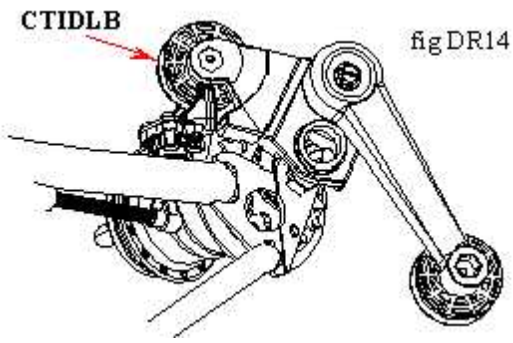


fig DR14

Next secure the chain tensioner using the chain tensioner nut CTN and its washer CTW. This nut should not be done up too tightly: somewhat more than hand tight suffices, max torque 8NM.

Now draw up the slack in the chain and feed it over the idler wheel on the sprung arm CTARM - check that the chain is flowing correctly by turning the cranks.

For a hub gear, the control has to be reconnected. Screw the indicator chain GICH into the hub, and make sure it is fully screwed home, then unwind through not more than half a turn so that it points towards the gear cable. Next connect the adjustor A to the indicator chain and, with the bike unfolded, make sure that it is correctly adjusted (see section G).

SECTION G: RUNNING ADJUSTMENTS & CHECKS.

It is important that certain of the jobs listed here are carried out at least once, if not two or three times, during the first few hundred miles of use when parts are bedding in (see chart on centre page). Thereafter, except for brake adjustment, they need to be carried out less and less frequently. If you are not confident about carrying out these jobs yourself, your dealer can help.

Hub Gear adjustment:

The aim is to make sure that the indicator chain down at the end of the rear axle moves to the correct position in response to moving the trigger. For this the cable has to be running well: it must be free of kinks or sharp radii, with the cable pulley rolling freely.

Adjustment of gears must be carried out with the bike *FULLY UNFOLDED* (i.e. NOT parked).

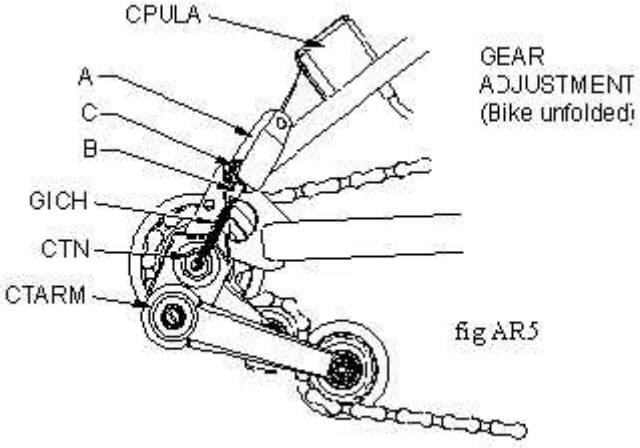


fig AR5

Also (fig AR5), if the indic- ator chain GICH has been detached from the adjustor, A, for any reason (say for wheel removal), make sure the indicator rod is screwed fully home inside the hub (and backed off not more than half a turn), before connecting to the adjustor.
While setting hub gears, always back and forward pedal a bit before checking a setting, and back pedal while changing gear. The cable is made tighter by pushing the adjustor further onto the grooved end B of the indicator chain: to obtain a looser setting, the spring clip C has to be depressed.
You can usually get things right first time by moving the trigger into the top gear, pulling on the adjustor (away from the pulley housing CPULA), and then feeding the grooved end B of the indicator chain into the adjustor until it is just not loose, i.e. *WITHOUT* pulling the indicator chain out of the axle at all.

The setting is correct when

a) with the trigger in top ("3"), the cable is just slack, in other words neither flopping around at all nor taut (if, when you try pulling the adjustor away from the CPULA, you can see any movement of the indicator chain back into the axle where it enters it, then the setting is too tight).

b) with the trigger in low ("1"), the indicator chain (where it enters the end of the axle) should either move not at all, or perhaps up to 1mm, when you pull the adjustor towards the CPULA (if it moves more than this, then the setting is probably too loose: on the other hand, if, while back-pedalling and moving the trigger slowly from position 2 to 1, you see that the indicator chain stops moving out of the end of the axle *before* the trigger has clicked into position 1, then the setting is too tight), and

c) when pedalling forwards (under no load) and changing through the 3 gears both up and down, all three gears are positively selected.

If you need to make any further adjustment, always select top gear and back and forward pedal a bit first. If you cannot obtain a satisfactory setting, then the most likely cause is either the cable not running freely, or damage to the indicator chain itself, where it runs into the axle end. Otherwise, the fault may be with the hub internals.

Derailleur maintenance and adjustment.

For satisfactory gear changes and smooth running, two stops need correct setting, and two key elements of the system have to move freely: the actuator (or "chain-pusher"), and both idlers on the chain tensioner

Chain pusher adjustment.

Use the stop screws, fig DR9, on the chain pusher. The idea is that, in high gear, the inner face of the inner upright IU, fig DR16, shall be as close as possible to the idler wheel, without any rubbing pressure while the idler rotates (to give the slickest change with minimum wear): when the setting is right, you should just be able to see daylight between the two while turning the cranks *forwards*, perhaps with occasional contact. Use a 2mm hex key in the forward stop screw H for adjustment.

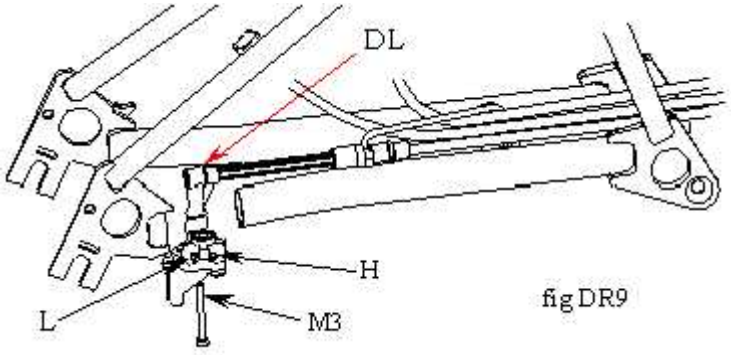


fig DR9

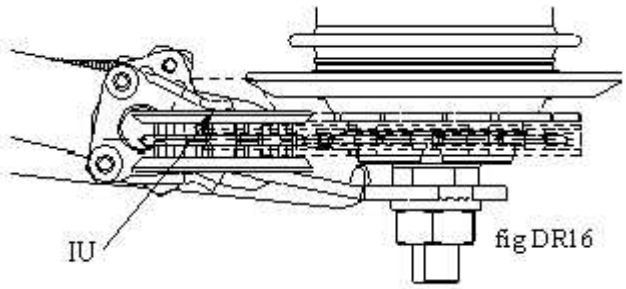


fig DR16

The same principle applies for the lower gear setting, only this time, fig DR17, the inner face of the outer upright OU has to just not rub on the idler, and the rear stop screw L is used for adjustment.

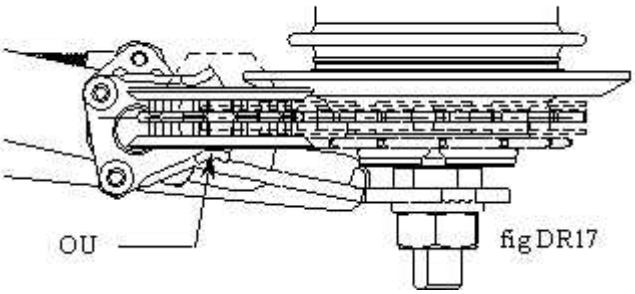


fig DR17

Cable adjustment should seldom be necessary, as the trigger moves the cable twice as far as the movement of the chain-pusher (an over-ride spring *inside* the dogleg DL absorbs this movement).

Derailleur trouble shooting.

If the derailleur still malfunctions after adjustment, or if turning the adjustor screws has no useful effect, and there is no obvious sign of dirt obstructing free movement, then the procedure for diagnosis is as follows. Step 1, remove the chain tensioner: this allows you to identify whether the problem lies with the idlers on the chain tensioner (they should be free to move in an

out 7mm) or with the chain-pusher. If the chain-pusher does not move freely, and the cause is not obvious, try slackening the M3 screw slightly (there is supposed to be clearance). Step 2, remove this M3 screw completely: this allows you to identify whether there is a problem with the cable and the dogleg link DL (e.g. dirt on the spring, misalignment of cable and cable stops, etc.), or with the chain-pusher (e.g. hidden dirt, seized bearing: you may need to remove the chain pusher from the frame).

Crank axle bolts and pedals:

The crank axle bolts should be torqued down (32NM, use a 14mm AF socket) after the first few hours of use, with occasional checks thereafter. Check also that the pedals are secure (torque 30NM): note that the LH pedal has a LH thread.

Seat clamp:

The quick release clamp (QR, fig FS1) should be kept adjusted so that the lever closes firmly when doing the clamp up; if the movement is slack and easy, with little resistance, the seat pillar will not be properly secured. As a guide, with the seat clamp lever forward (i.e. done up), the adjustor nut AN should be tightened with a torque in the range 5-8NM and the maximum closing force needed at the end of the lever while securing the clamp should lie in the range 80-120N. The correct setting will depend on the weight and strength of the user.

Do not over-tighten, as this can cause damage. For normal tightening during the life of the machine, a sixth of a turn or less of the adjustor nut will normally be quite sufficient.

If, after adjusting the clamp, the seat pillar slips in use, then the cause is almost certainly oil or grease. Remove the seat pillar from the bike, and using soapy water, thoroughly clean both the seat pillar and the sleeve in the main frame.

Spokes:

These tend to bed in during early use, and to lose some of their initial tension. which can cause spoke failure (particularly for heavier riders). See that these are re-tensioned correctly after initial use, and check thereafter.

Saddle clip bolt:

Because this passes through the body of the saddle, which is moulded nylon, some settling of this nylon during early use may reduce the clamping force in the clip bolt: you ought now and again to check that the nut on this clip bolt is firmly secured (torque 13NM).

Handlebar clip bolt:

Check that this is properly secured, torque 15NM. If it is loose, the handlebars may slip without warning.

Brakes:

The brakes should be set so that the pads are as close to the rim as practical without actually interfering with the free running of the wheel. When setting the rear brakes, the bicycle should be in its un-parked position. Adjustment is carried out using the threaded cable stop on the brake lever (or, on a C-type, at the caliper).

Dual-pivot calipers, centering. These are not self-balancing, and need to be trimmed so as not to exert any side force on the rim. Apply the brake and watch for any trace of sideways motion of the rim or tyre as the pads engage: adjust the M5 set-screw (visible on top of the caliper - use a 2.5mm hex key) in order to get the caliper properly balanced. (If after doing this, the caliper appears "lop-sided", with one arm lower relative the rim than the other, then the whole caliper assembly needs to be re-positioned in the frame. Slacken off the main nut (10 AF) holding the brake spindle, adjust the M5 set-screw to get rid of the uneven look of the brake, and do up the main nut again while pulling on the brake lever. Finally, re-trim the caliper so as to centre the pads using the M5 set-screw.)

Dual-pivot calipers, pad position. As these wear down, or after any adjustment as above, the pads may no longer bear centrally against the braking surface on the rim: re-position as needed.

Cup and cone bearings:

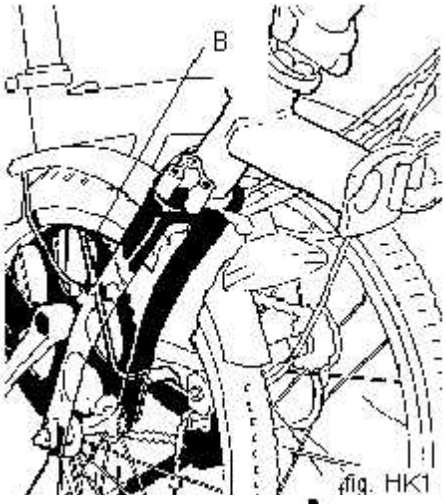
If these are set over-tight, damage is likely, and in the case of a geared rear hub, the freewheel will tighten up as well (in turn causing chain problems during folding). Always ensure that the relevant locknut is secure after adjustment:

a) **wheel hubs**: set so that very slight play is just discernible at the wheel rim. On the rear geared hub, do ***not*** use the RH cone for bearing adjustment. Instead use the two nuts (22AF) at the LH end: the bearing cone here is unthreaded, and its position on the axle is set by the inner of these two nuts, which is in turn locked in position with the outer.

b) **steering head**: set so that no play is discernible, and so that (after tightening the lock-nut) the steering is still free, and without tight spots.

SECTION H: OTHER DESIGN POINTS TO DO WITH FOLDING

Hook:



Correct function of the hook is important for satisfactory folding: it retains the front wheel in place when the bike is folded. It is attached to the front mudguard stay (or, if there are no mudguards, to a special wire form, not illustrated). If it is knocked out of position, the design allows it tobe bent back. For the function to be correct:-1. The chainwheel mustn't be too far out. Part of the stay, B (fig HK1), acts as a buffer against the chain wheel during folding, and steadies the folded front

1. The chainwheel mustn't be too far out. Part of the stay, B (fig HK1), acts as a buffer against the chain wheel during folding, and steadies the folded front wheel. If the chainwheel lies too far out (the gap G (fig HK4) between inside of chain and hinge plate RHPL when the bike is parked, should be 0-3mm, not more), then the hook will be a tight fit over the chainstay CHS, and may stick when trying to unfold the front wheel.

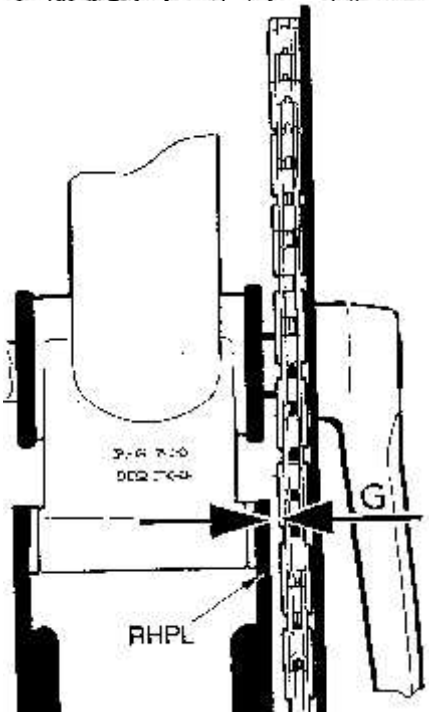
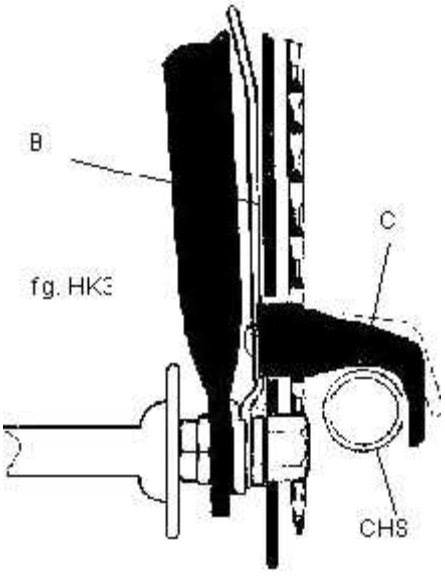


fig. H3

2. The hook must not be bent wrong (fig HK3): if it is bent up too far, then a) it may catch on the rear spokes, and b) it may slide off the tube CHS, causing the bike to unfold inadvertently. If it is bent down too far, then the hook will contact the tube CHS at C before the front wheel (and the rest of the bike) has dropped to its fully folded position. If it is bent fore/aft it may strike the chainwheel or (if fitted) the derailleur changer, and if the stay is "crushed" in, the front wheel spokes will clash with the chain tensioner nut as the bike is folded.



If the hook is ineffective, and/or sticks during unfolding, then, bearing the above in mind, judicious bending of the wire stay (say by pulling on the hook) should cure the problem.

Handlebar catch and nipple:

The "body" of the handlebar catch acts as a stop to align the front wheel correctly during folding. The correct torque for the securing screw is 9NM.

Operation of catch and nipple: keep these correctly set, for, if wrong, the handlebar catch will loose its spring effect, with the irritating result that the handlebars unlatch too easily from the folded package.

Alignment of the catch, HBC: the catch itself must be aligned so that the nipple enters centrally (fig HB3 rather than HB4)

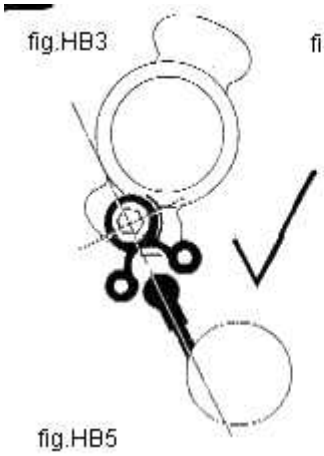


fig.HB3

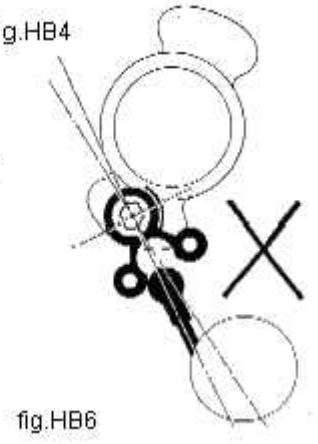


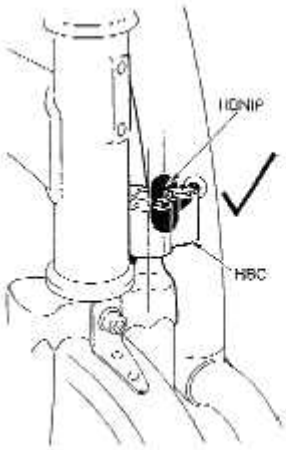
fig.HB4

.Alignment of the nipple, HBNIP: this should be in line with the catch HBC as it enters it during folding (fig HB5 rather than HB6). Bear this in mind if making adjustments as described below.

fig.HB5

fig.HB6

Offset of the nipple, HBNIP: if the handlebar itself, or the control levers/cables, are set too far forward, they may, on folding, foul against the front wheel and so prevent the nipple from fully entering the catch (i.e. as per fig HB8). To remedy, either reset the handlebar or levers further back (i.e. further out when folded), or unscrew the nipple so that it is further from the support tube, HBS: the nipple must be able to enter the catch HBC fully, as per fig HB7.



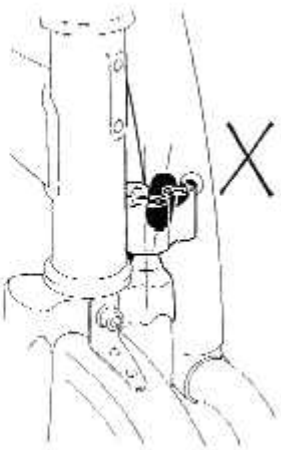
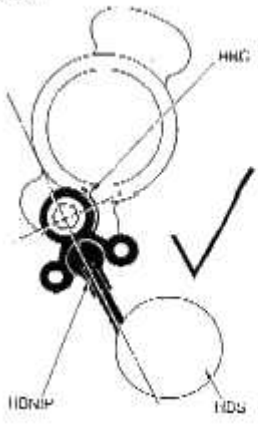
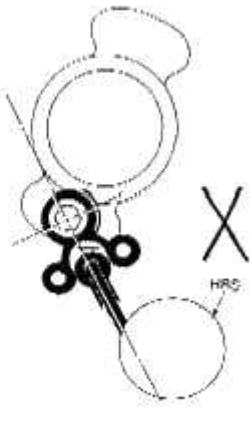


fig.HB7

fig.HB8

If the set up is correct and the catch remains ineffective, either replace the h'bar catch, or you may obtain a temporary cure by twisting the nipple slightly (i.e. as not normally recommended, fig HB6).





Lower stop disc:

When you pick up the folded bike, the rear frame cannot unfold because the lower stop disc, LSD, butts against the "folded" seat pillar, SP. The LSD can be adjusted to give the correct gap between itself and the SP: if the gap is too small, then the SP may foul, irritatingly, against the LSD during folding. If the gap is too large, then the rear wheel will drop away too far when the bike is picked up, so that the hook retaining the front wheel slips off the tube CHS on the rear frame. The correct gap is 1-2mm (fig LS1).

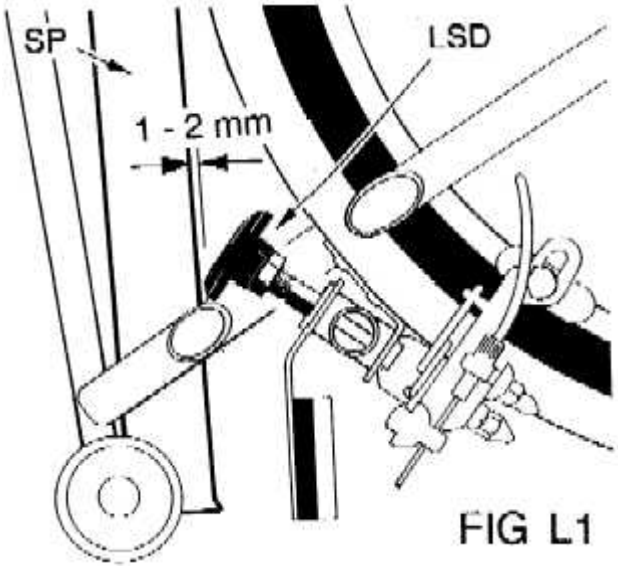
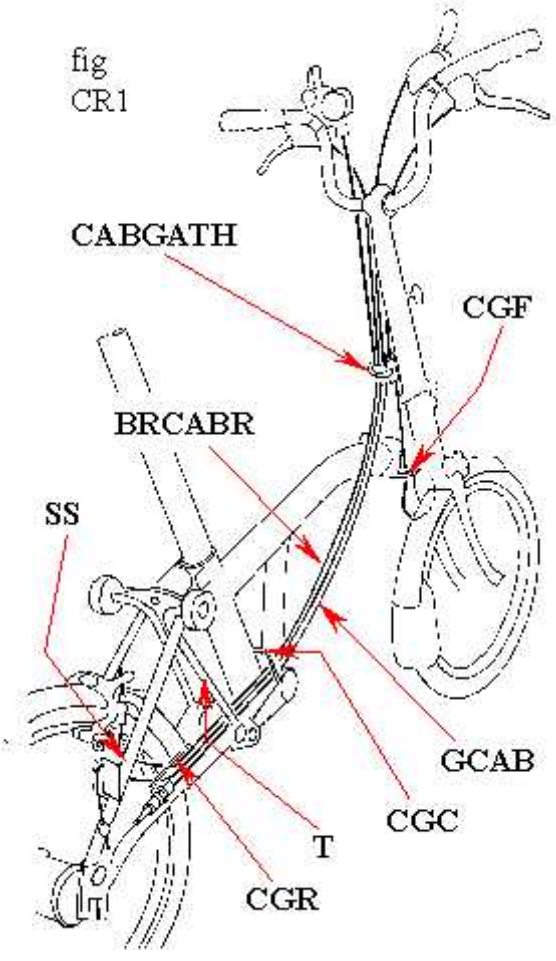


FIG L1

To set the lower stop correctly, you need a 15AF and a 19AF spanner. Do not over-tighten the lock-nut, correct torque 8NM.

Cable routing, fig CR1:

The routing of the cables is carefully worked out, and when replacing cables, correct routing is vital if these are not to be damaged during folding. Also the outers should be exactly the same length (+/- 2mm) as the original cables, and also have same ferrules (if fitted): always use lined outers, and PTFE coated inner cables.
All cables MUST pass in front of the handlebar, to the left of the handlebar stem and to the right of the main frame tube. The FRONT brake cable must pass through the forward cable guide CGF. The REAR cables must pass through the cable gatherer CABGATH on the front brake cable, the centre cable guide CGC and the rear cable guide CGR as shown: they should also pass inside the tube TT and the tube SS. The gear cable GCAB should lie below the brake cable BRCABR (if the bike has both derailleur and hub gears, the derailleur cable should be lowest).



Rear hinge screws:

These are factory set with a torque of 10NM, using thread-locking fluid, and (unless there is a problem) should NEVER be checked or moved.

SECTION J: LUBRICATION.

When lubricating your Brompton, avoid getting oil or grease on the seat pillar or the wheel rims.

Grease is the right lubricant for all wearing parts (oil does not last as well), and where it is practical to dismantle an assembly and apply grease, it's best to do so. However, this is often inconvenient or impossible, and oil can be used instead, but note that applying oil to a greased assembly can cause the remaining grease to be washed away fairly quickly, and frequent re-lubrication is needed thereafter (unless you re-grease).

Choice of lubricant: any good quality general purpose grease is satisfactory, especially lithium based. For the chain, proprietary chain lubricants with good penetrating properties give the best results. As for oil, some spray-on products are convenient to use, otherwise employ an ordinary light mineral oil. For the rear hub, Sram recommends:

a) for the bearings and gears, Sram grease "Fett type A": Brompton can advise where to obtain this.

b) for the pawls, light mineral oil.

The chart on p.25 shows what to lubricate. For medium frequency items (marked "3"), a sensible guide for the interval between lubrication is a year, or 5,000 miles.

Notes:

a) *Chain:* for smooth pedalling the chain HAS to be well lubricated: if the bike is used in the wet, this should be done frequently. The easiest way to cover the whole chain is to turn the pedals backwards while applying oil: make sure that the oil flows both onto the rollers and between the side plates: turn the pedals a few more times to allow the oil to work in, and then wipe off excess oil.

b) *Hinge clamps:* a thin smear of grease on the inside faces of the clamp plates ensure that these release OK: the thread of the clamp bolt, and its washer, should also be greased.

c) *Folding pedal:* the pivot spindle on which it folds likes greasing from time to time. The main bearing, which is grease packed, should not be oiled: however, if the bearing is not running freely, some oil fed in past the seal will extend its useful life.

d) *Rear hinge:* this comprises a stainless steel shaft running in pre-greased bushes and these will normally give a very long maintenance free life; however, after the first say 10,000 miles or 2 years, an occasional application of oil is recommended.

e) *Hub gears:* the gears and bearings are sealed; greasing need only be carried out during major service.

SECTION K: ROUTINE REPLACEMENTS.

Planned replacement is advised to ensure both safety and good performance. The suggested intervals between replacements are for bicycles subjected to normal use: the most appropriate timing depends on the conditions of use and your riding style.

1. *ALUMINIUM COMPONENTS*: as on other lightweight machines, aluminium alloy is used in the construction of the Brompton, and this material has a finite life before failure. In normal use, the risk of aluminium fatigue failure is remote, even after many thousands of miles. However, the risk of failure increases with use, especially with hard riding or other severe loading: **as such a failure could cause injury**, the hinge clamp plates, handlebar and chainset should for safety be replaced every 5,000 miles (more frequently on any machine subjected to hard use), and we recommend that these items are anyway checked regularly. For the handlebar, an alternative is to fit a cross bar (see Section M).

2. *Transmission:* if the chain is allowed to stretch unduly, through lack of lubrication or long term wear, power transmission will be inefficient and rough and the sprockets will also wear quickly. A new chain is not expensive: so replace every 2 - 3,000 miles (or sooner if it has lacked lubrication or been used in harsh conditions). If you have allowed the chain you are replacing to stretch unduly, you will almost certainly have damaged the rear sprocket(s), and possibly the chainwheel too: these should be checked when fitting a new chain and if worn should be replaced at the same time as fitting the new chain.

3. *Brake cables:* these do not have an indefinite life, and to reduce the risk of brake cable failure, replace the inner cables at intervals of 4,000 miles or less. If there is any doubt about the free running of the cables, the outer cables should also be replaced. New outers should be exactly the same length as the original cables, with the correct terminating ferrules.

4. *Gear cables:* though less safety critical than brake cables, the hub-gear inner control cables should be replaced at the same interval as brake cables.

5. *Tyres:* the risk of punctures increases with the mileage covered, as the tyre accumulates small sharp particles in its tread. You should reckon on replacing the rear tyre every 3 - 4,000 miles and the front tyre every 6,000 miles.

6. *Lighting on the T-type:* a) repeated flexing of the wires around the rear hinge when folding eventually causes failure - replace the wiring loom connecting the dynamo to the front light at intervals of 7,500 miles: b) front bulb and dynamo: these can have a very long life between failure, but performance deteriorates - replace after 250 hours.

8. *Suspension bush* (flanged bush under the suspension block): 10-15,000 miles.

SECTION L: SPECIFICATION OF SPARES.

Chain: this **must** have the correct number of links for a given sprocket combination, as noted below. Also traditional joining links are usually unsuitable because the pin is too long: so instead the joint should be made by pressing in the rivet pin. We recommend Sram PC1 (1/8") and PC10 (3/32") chain.

- for non-derailleur, size ½" x 1/8": max. pin length 8.7mm: number of links 50T/13T/**98L**, 44T/13T/**96L**, and 44T/14T/**96L**
- for derailleur, size ½" x 3/32": max. pin length length 7.4mm: number of links 54T/16T/**104L**, 50T/15T/**100L**, and 44T/15T**/98L** (the rear sprocket size given is that of the larger, inner sprocket).

Rear sprockets for geared hub (to ISO 10230): non-derailleur, ½" x 13T x 3mm thick (but for lower gearing, use a 14T or 15T sprocket): derailleur, special Brompton sprockets, 13T and 15T only.

Chainset. Best to use the Stronglight set specified for the Brompton. If you use an alternative, make sure that it suits the BB axle (ISO 6695), that it gives the correct chainline (fig HK4), and that the end of the crank does not clash with any part of the rear frame when the bicycle is parked.

BB cartridge. ISO 6695. For C-type, Ritmo S x 127mm. For other models, FAG 119mm.

Chain tensioner idler sprockets: non-derailleur, 10 tooth x 3/32" wide at the teeth, x 1/2" wide at the centre, mounting hole to receive M5 bolt: derailleur, special flanged Brompton idlers.

Brake pads: Alhonga HJ 454-11.

Tyres: size 16" x 1.3/8", ETRTO 37-349. Inner tube with Schrader valve. Best to use the special high-pressure Brompton tyres (see Section M). But if you cannot obtain these, choose another reputable make: take care, as some tyres lose shape on inflating, and/or offer a lot of rolling resistance, and some tubes lose pressure fast.

Control cables: The cable routing and terminations are critical. For outer cables the length, and ferrule diameter should be identical to that of the cable originally fitted: for the front brake cable, the outer must be in two parts of the correct length, so that the cable gathering ring occupies the right position in the cable system. You are best advised to use cables supplied by BROMPTON. If you have to use cables from another source, specify low friction cables (PTFE coated inner cable, lined outer cable).

Dynamo: AXA IQ right hand fitting. Other 6v dynamos are also suitable, but you may need to fit a special slotted stay (available from Brompton).

Front lamp bulb: 6 volt x 2.4 watt halogen. Do not touch the glass when fitting.

SECTION M: OPTIONS AND ACCESSORIES.

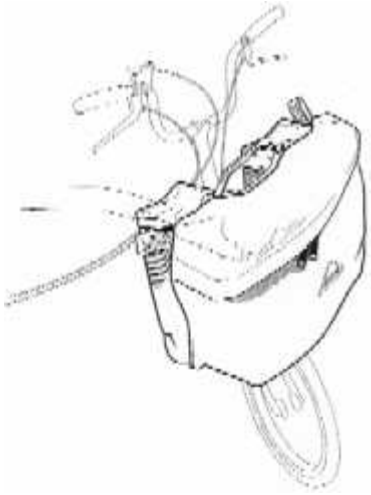
LUGGAGE, the front carrier system.

The Brompton system provides a highly convenient method for taking luggage on the bike as it only takes a moment to attach or release it. As the load is effectively attached rigidly to the main bike frame, it has little effect on steering. The system is a delight to use, especially if you regularly need to take luggage or shopping with you.

At the heart of the system are a tapered block and a special frame which latches onto it. Then is then a choice of 3 soft-luggage options that fit over this frame: all are badged for safety with a reflective mark. A shoulder strap (not shown) is available for the panniers

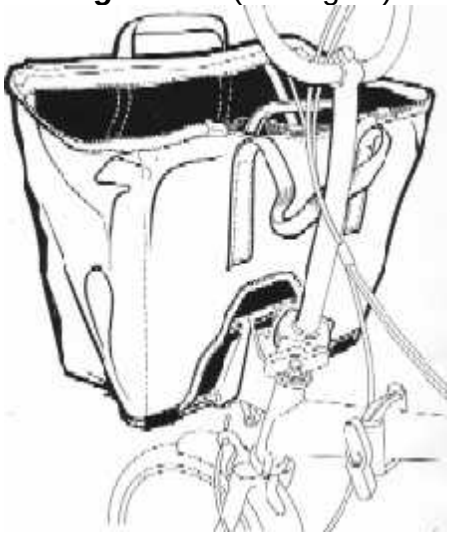
Front carrier block and clip (100 gms). A mounting kit is provided, and with this the block is made fast to the bicycle. The block has a sprung clip to ensure that luggage remains in place when riding. The block does not project from the folded package.

Cloth pannier (1380 gms), a handy and practical holdall made from tough waterproof polyester fabric. The main compartment has a divider for keeping papers separated from other articles. At the back, there are two pockets for items such as tools, maps etc. Total capacity is 22 litres. All the compartments have zip fasteners.

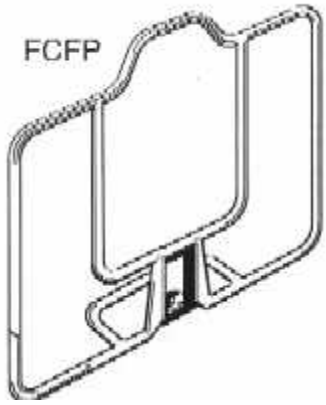


Touring pannier (1670 gms). With considerably more capacity than the cloth pannier, this has, instead of zips, a roll-top system, with nylon clips, for closing. Like the cloth pannier, there are two pockets at the back, and a divider inside: in addition there are three elasticated net pockets around the outside, where you can stuff things which you may want during your ride. Total internal capacity approx 28 litres.

Folding basket (1340 gms). Using the same material as the panniers, this provides a large, open-top container, ideal for shopping. Mounted on the bike, the shape is maintained by virtue of a simple bracing frame, which folds flat for storage. Drainage holes are provided in case of rain. When used as a basket off the bike, it has the character part bag/part basket, and you have to take a little care when stowing goods if you want it to stand up properly. Capacity is 24 litres

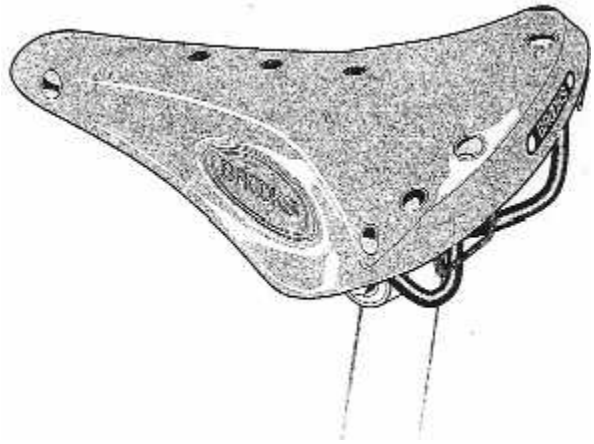


Rainproof cover (55 gms, not shown). Though the material on the Brompton luggage items is PVC coated, leakage is possible during prolonged rain through zips or seams. The Brompton rainproof cover gives complete protection against rain, with an elasticated hem to keep it in place. It's colour is a highly visible, bright yellow: when not in use, it takes up next to no space.



Front carrier frame (690 gms), a brazed, tubular steel frame, with a plated finish. The top member provides a carrying handle and the base gives support for the load. Its principal use is as backbone for the cloth items, but it may also be used on its own to carry other luggage tied to it.

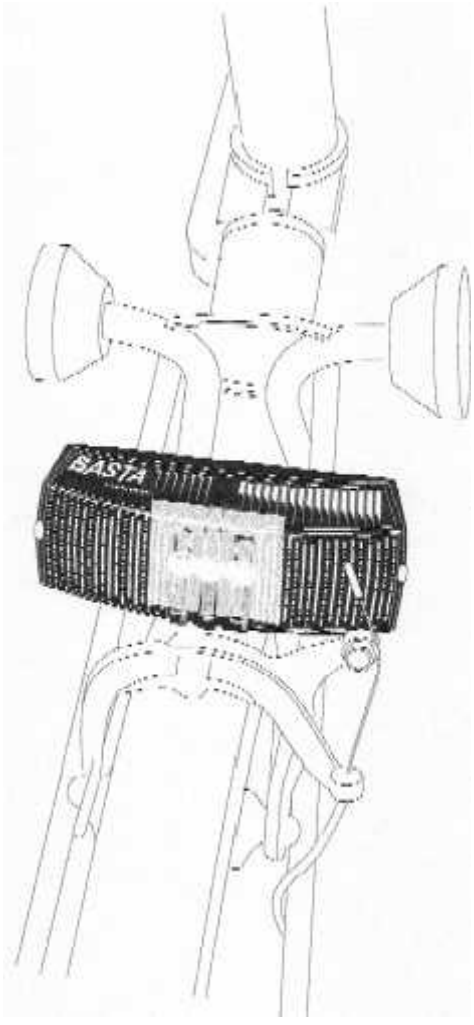
COVER & SADDLE BAG (240 gms). In many situations, say on trains, or when the bike is dirty, a cover is useful. The Brompton cover is quick to fit or remove, and it can be drawn tight around the base of the bike by using its draw-cord. The saddle bag is a home for the cover when it's not in use.

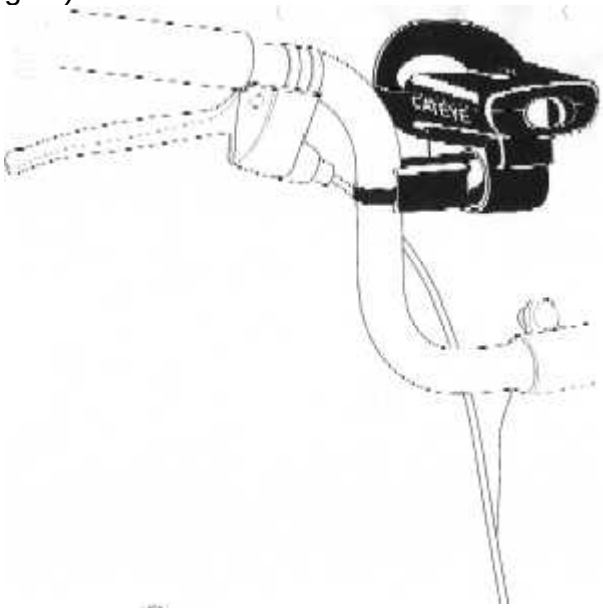


BROOKS LEATHER SADDLE for the Brompton: If you are thinking of a change of saddle, you should consider the special Brooks leather saddle made for Brompton (extra 420 gms). This beautifully made traditional saddle will give years of comfortable riding. For real refinement, you can specify a titanium frame, obviously light (extra weight only 185 gms), but also with more spring.

LIGHTING

L-type battery lighting system. The relatively lightweight rear lamp stays permanently on the rear frame, out of harm's way, while the heavier front lamp is removed for folding. **Rear lamp**: Basta extra bright 6LED type, with integral reflector: 2 or 4 AA batteries give approx. 20 or 40 hours' use. **Front lamp:** Cat Eye lamp with very easy quick release system: 2 size C batteries give up to 17 hours' use. The set includes batteries and the special mounting brackets needed front and rear for attaching the lamps. Weight with front lamp removed 140 gms (complete 350 gms).

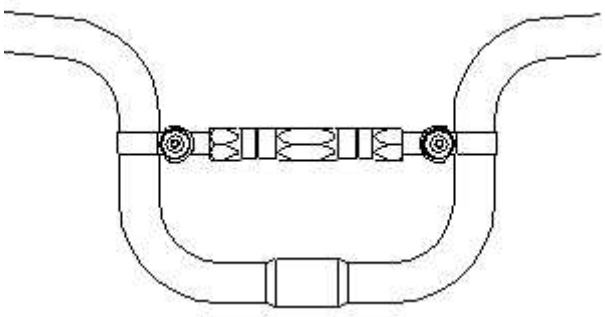




T-type dynamo: "standlights". A rear light which stays on when you're stationary is a great safety feature: the Basta 6LED rear standlight stays lit for 4 full minutes after you have stopped (with a button for turning it off sooner if you want, say at the end of a ride). For the front, the Cat Eye lamp (as above) can be used: its large switch is very handy for frequent operation.

T-type: special dynamo stay. If you wish to use a dynamo different from the normal Brompton dynamo, it may, with luck, fit directly onto the standard stay. However, if not, we offer a stay where the bracket is SLOTTED, which allows nearly any type of bottle-dynamo to be fitted.

HANDLEBAR CROSSBAR.



If you ride hard or regularly (and particularly if you jump over kerbs), your handlebar may not last for ever: as failure can cause injury, we recommend that handlebars are replaced at regular intervals. But for greatest safety, you can fit the crossbar (suitable for normal Brompton bars).

REPLACEMENT TYRES.

Our high performance tyres, compared to ordinary road tyres, make a really noticeable difference to the performance of the bike: more expensive, but well worth it. Whatever happens, avoid using any old tyre: on a small-wheeled bike, a good tyre is essential, and certain cheap makes can completely spoil the fun by making pedalling far more effort.

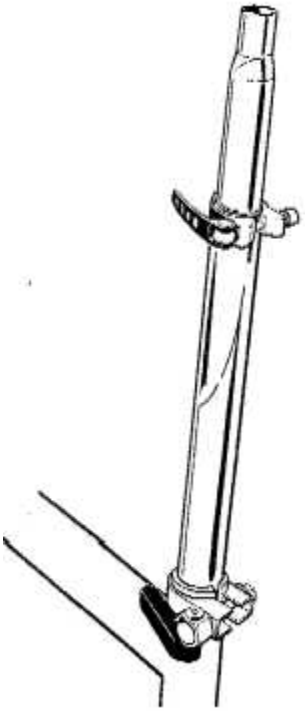
Brompton standard tyres, 42FL, "yellow". Standard on L-types and T-types, these are exceptionally free-running, durable and lightweight.

Brompton Kevlar tyres, 42FT, "green", with the same skin-wall build as the 42FL, except for the inclusion, under the tread, of a Kevlar belt. This much reduces the risk of punctures, and it barely has any effect on the attractive free-running qualities of the 42FL.

Schwalbe Marathon. Though heavier (110 gms per pair) than the 42FL, and not as free running, its advantage is its robust construction. Like the 42FT it has a Kevlar belt included, but it differs in having a) a deeper unidirectional tread (with improved grip off tarmac) and b) a heavier side-wall to reduce the risk of "pinch-punctures".

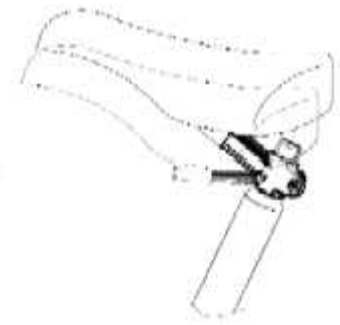
Raleigh Record: an inexpensive, hard wearing, good quality, conventional road tyre, fitted as standard on the C-type.

SADDLE POSITION. If you need a higher saddle and you can live with its projecting slightly from the folded package, fit a longer seat pillar and/or a saddle adaptor pin (pointing up). Note: additional height is also possible by fitting other types of saddle.



1. Longer seat pillars:

EXTENDED SEAT PILLAR (extra 150 gms), 60mm longer than the standard seat pillar.
TELESCOPIC SEAT PILLAR: permits a saddle height up to 175mm higher than normal, yet when lowered, the saddle projects only 30mm from the folded package (extra 295 gms).



2. Saddle adaptor pin (125 gms)

a) mounted "pointing *down*", it allows the saddle to be moved up to 40mm forward (which also makes the folded package the most compact)
b) mounted "pointing *up*", it allows the saddle to be moved up to 30mm higher, albeit slightly further forward.

GEARING.

Suitable rear sprockets and Stronglight/Brompton chainwheels are available to give gearing 12% lower or 18% lower. If you want to use our chainwheels to change the gearing on a C-type, then the FAG 119mm bottom bracket cartridge must be fitted instead of the Ritmo 127mm cartridge.

OPTIONS FOR THE C-TYPE ONLY:

FOLDING LEFT HAND PEDAL: The Brompton folding pedal has an ingenious design, using a precision industrial bearing. It allows you safely to use both sides of the pedal in the normal way, and yet to fold it at a touch, leaving a projection of only 20mm.

MUDGUARDS: Complete set with all stays, mud-flaps and fastenings, for retrofitting to the C-type (365 gms).

PUMP: high pressure pump with thumb-lock connection, made specially for Brompton by Zefal. If required this can be kept permanently to hand, on the rear frame.

BROMPTON BICYCLE LTD
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(and at www.bromptonbicycle.co.uk) April 2002