



FITTING A COMPLETE REPLACEMENT DERAILLEUR CABLE SET

As a result of changes to the Brompton, different cables are required for different models:

- a long-wheel-base M-type bike (one shipped after January 2004, and with a main-frame hinge which is cast) requires **longer rear cables** than a short-wheel-base M-type (where the hinge is forged, with a hand-brazed joint): M-types were formerly called L- or T-type.
- The P-type and H-type use the same cables. The M-type has its own cables as does the S-type.

Make sure that you have the right length cable for the bike in question. **The application sheet shows for which model this cable is suited.**

Remove the rear wheel (summary below, and full details are given in the Owner Manual).

subtext dr cab trig rem

Disconnect cable at trigger. Move the derailleur lever up. Unscrew the screw holding the trigger cap, and remove the cap. Lift the lever, with the cable still attached, away from the trigger housing. Slacken the small grub screw in the threaded nipple TN where the cable is anchored (1.5mm hex key needed), and withdraw the cable: *take care not to lose the threaded nipple, which can drop out the moment the cable is withdrawn.*

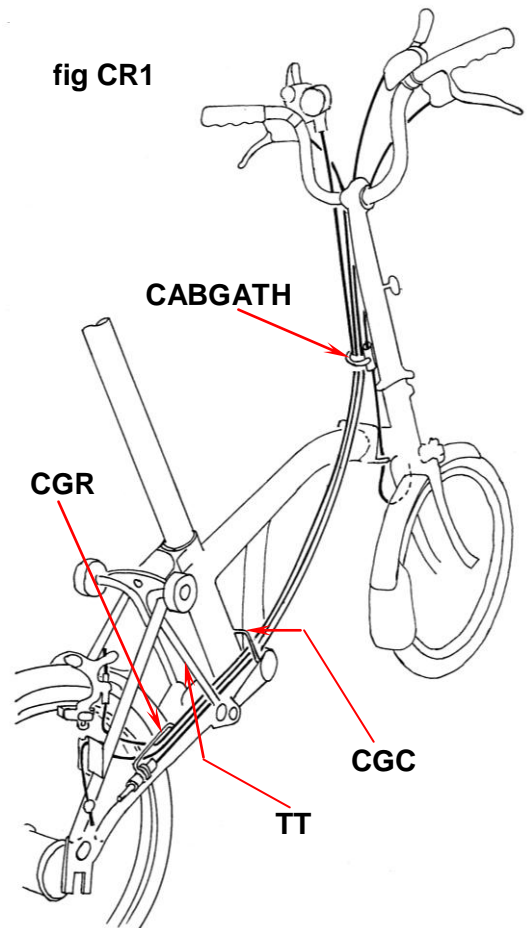
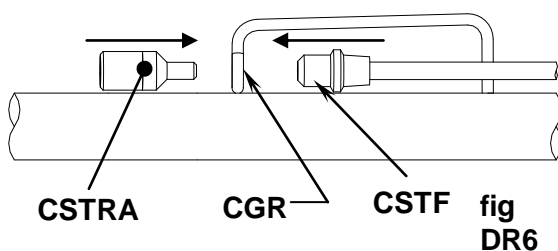
Undo the M3 x 30 screw (fig DR9): before removing it from engagement with the dogleg DL, grip the spring so that it does not suddenly extend. With the screw withdrawn, allow the spring to extend bit by bit in a controlled way, till it's fully relaxed.

Withdraw the inner cable from the outer, remove the outer, and discard unwanted parts (if the the dynamo wiring loom is attached to the derailleur cable, then it needs to be disconnected by cutting the tiewraps: spares are supplied for reconnection later). Check that the actuator, CHPUA, is able to rotate freely between the two positions. If there are signs of stiffness (and these are not caused by visible dirt), now is the time to replace it or its bearing.

dr retro fit ds, part

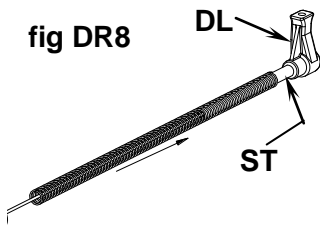
For the outer cable, correct routing is important, fig CR1. The derailleur cable should lie **under** the other two rear cables, so push them up and out of the way while feeding it through. And, for neatness at the front end, avoid twisting the new cable around the others.

You can feed the outer cable from the front or the rear: either way the cable must pass (starting at the rear end) outside the forward leg of the rear cable guide CGR, inside the tension tube TT, through the centre cable guide CGC, and through the cable gatherer CABGATH. With the cable in place, fit the forward cable stop, CSTF, over the back-end of the cable (the CSTF to be the correct way round, chamfer pointing aft), and then push the cable and the CSTF aft till the chamfer on the CSTF is a snug fit against the loop in the cable guide CGR. Finally fit the CSTR through the loop in CGR and into the CSTF.



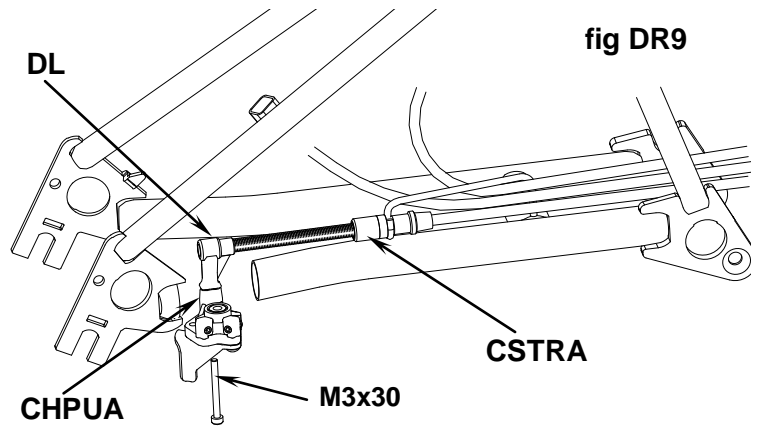
Let the other cables fall back down to their normal routing. Leave the forward end of the derailleur cable unconnected for the time being.

Inner cable and spring:

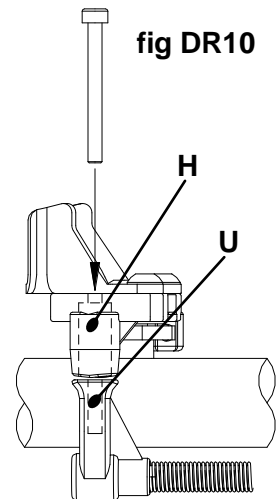


Feed the spring, fig DR8, onto the front of the inner cable, and let the spring pass outside the spring tube ST to rest against the dogleg DL. Next, feed the inner cable through the cable stops and into the outer cable from the rear.

The dogleg DL at the end of the cable now has to be connected to the CHPUA, fig DR9, which involves compressing the spring (note: you may well find this easier with the bike upside-down, i.e. not as in fig DR9). If you are to avoid kinking the inner cable (which is important), you have to take care during this stage not to allow the spring to jump loose! You need both hands to compress the spring: so have the M3x30 screw to hand, ready for fitting while you hold the spring compressed. To compress the spring, feed 20mm or 30mm at a time onto the spring tube, ST, gripping it in place each time. Move the "dogleg" and spring-tube forwards till the forward end of the spring tube ST has entered the cable-stop CSTR: the dogleg DL should now be in the correct position for



connecting to the chain pusher, CHPUA. With one hand holding the dogleg to



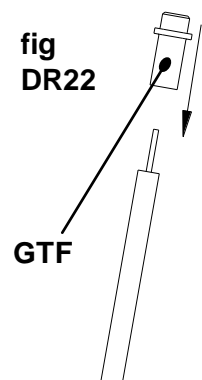
keep the spring compressed, feed the screw down (or up) through hole H in CHPUA, and right into the counterbored portion U of the dogleg: you can now relax. Do up the screw while supporting the dogleg: the action is fairly stiff as the screw is cutting its own thread. When the screw becomes tight at the end of its travel, **back it off one full turn**: the dogleg should not be clamped tight against the CHPUA: there should be slight vertical play, and the CHPUA must still be free (now against spring pressure) to rotate to and fro. If there is any stiffness, back off the screw a bit further.

subtext dr cab trig fit

Connecting the cable to the trigger.

Note about override spring. By design, the trigger moves the cable almost twice as far as is needed to effect the gear change: so, while the trigger is being pulled down, the actuator on the rear-frame will reach the low-gear position before the trigger is fully down, the excess cable movement being absorbed by the override spring at the bottom end of the cable. This means a) that, with the trigger up (high gear), it is OK to have a little slack (up to about 3mm) in the cable, and b) that, as the cable stretches over time, no cable-adjustment is needed. The procedure outlined below for connecting the cable will keep the initial slack to a minimum, so that as much as possible of the trigger motion is reserved to cope with future cable stretch.

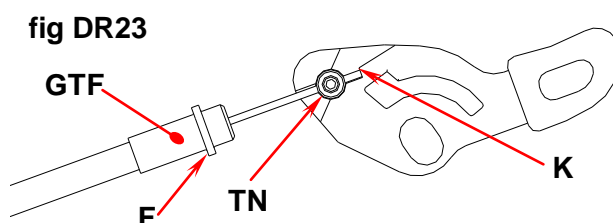
Down on the rear-frame, check that the two cable stops are pressed against the loop on the cable guide CGR, and that the cable outer is seating properly in its cable-stop. (If you have made any changes to the actuator (CHPUA), the high-gear stop screw should have been set.)



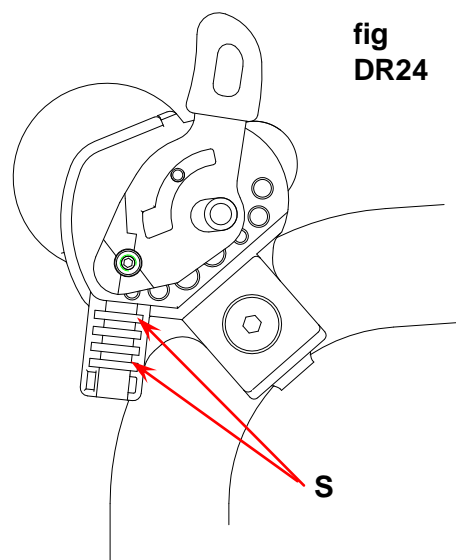
Don't forget to fit the cable-stop GTF over the loose end of the cable first, fig DR22. Also (if necessary) slacken off the grub screw in the threaded nipple TN far enough for the inner cable to pass through.

Next, fig DR23, with the TN in place through the hole in the lever (**and the lever still out of the trigger housing**) feed the inner cable through the nipple TN at the angle shown till the cable abuts the surface K on the lever. Do up the screw in the nipple to secure the cable. [Note: if you allow more cable to extend past the nipple than is allowed by surface K, this loose end will interfere with the free movement of the lever, and cause poor gear-changing.]

Now, holding the ferrule GTF in one hand and the lever in your other hand, pull the inner cable out a couple of times (taking care not to kink the cable). You will feel the resistance of the springs: this action should make sure that the cable ends and stops are all settled correctly in place.



When assembling the lever into the trigger housing, the bike should be **fully unfolded** in order to set the cable correctly. This correct setting is obtained by fitting the ferrule GTF so that its flange F engages one particular preferred slot of the four slots S, fig DR24, in the housing. To do this, fit the lever part-way onto its pivot (the raised boss), and then pull "gently" down (see note below) on the ferrule, away from the lever: allow the lever to rotate anti-clockwise till it turns no further. At this stage decide which slot to fit the ferrule into: the correct slot is the one in line with the flange F, or else the next available slot **nearer** to the trigger-lever (i.e. such that the cable-inner becomes slightly slacker). Feed the lever fully into position on its pivot in the housing, and let the cable ferrule drop squarely into the selected slot. Secure the trigger cap back into place, squeezing it together towards the housing where the cable enters.

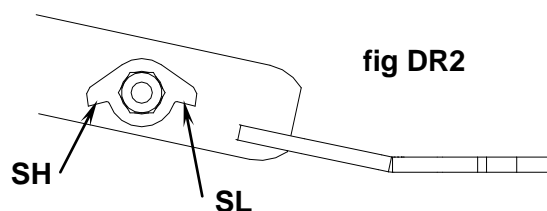


Note: when putting a pre-load onto the cable, this must be a gentle pre-load only, to take up the slack without moving the inner relative to the outer, i.e. a load just sufficient to make sure that the cable outer abuts properly against its stops.

If an appropriate slot for the GTF cannot be found, the cause may be a) that the cable outer is not seating correctly in the CSTF or in the GTF, b) that the CSTF is not bearing against the loop in the CGR, or else c) that the cable supplied is the wrong length (the outer should be 1173mm and the inner (excluding the nipple) 1297mm).

Checking that the cable is set OK at the trigger.

Operate the trigger a few times, and move it back to the UP position. The actuator CHPUA should be fully "out", with the stop-screw H contacting the surface SH of the "wing plate": if it isn't in contact, then the cable is too tight, and the ferrule GTF needs to be moved up a slot in the trigger. Also check for play in the cable: grasp the



cable outer just where it comes out of the trigger and pull it up and down, but not hard enough to move the CHPUA: if there is more than 3mm of slack, then the ferrule GTF needs to be moved down a slot. A further check is to move the trigger *slowly* down from the up position: the CHPUA should complete its movement to the inner, low-gear position well before the trigger has latched down.

If the bike has a wiring loom which has been detached from the derailleur cable, use the tiewraps supplied to re-attach it. The rearmost tiewrap must be aft of the CGC, **not** in front of it.

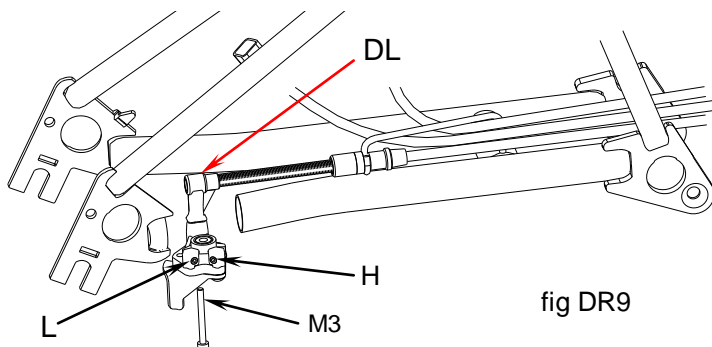
Fit the rear wheel and chain tensioner. For bikes with hub gears, reconnect the hub-gear control. Check the derailleur adjustment. Details elsewhere in these notes.

subtext gadj dr

DERAILLEUR ADJUSTMENT.

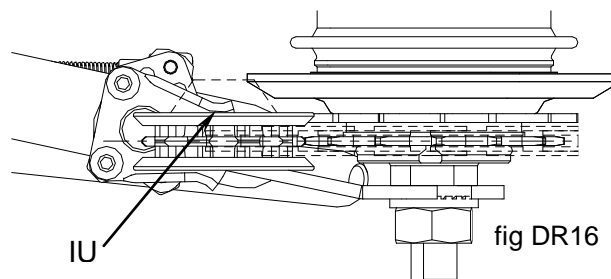
After any changes or maintenance on the rear frame fittings or wheel, the settings should be checked. With a new chain pusher, the derailleur stop screws must be adjusted.

You should also be aware that, for satisfactory gear changes and smooth running, apart from these stop screws, two key elements of the system have to move freely: the actuator (or "chain-pusher"), and both idlers on the chain tensioner.

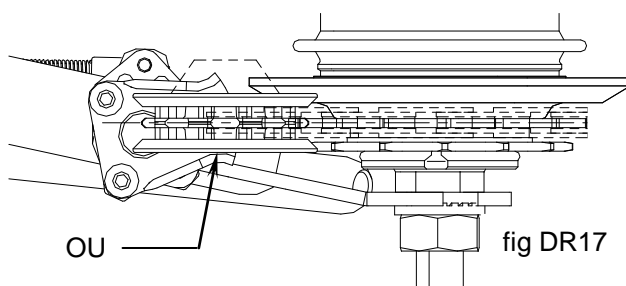


Chain pusher adjustment.

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.



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.



Cable adjustment should seldom be necessary, as the trigger moves the cable twice as far as the movement of the chain-pusher (an override 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 and 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).

REAR WHEEL – SUMMARY OF PROCEDURE FOR REMOVAL AND REFITTING.

Removal:

1. Move gear-trigger(s) up to high, and pedal forward & back to engage the high gear(s)
2. If the bike has a hub-gear, disconnect the gear-indicator-chain from the cable-anchorage, unscrew the gear-indicator-rod and withdraw the rod from inside the axle.
3. Remove the chain-tensioner: unhook drive-chain from swinging arm, undo chain-tensioner nut, and withdraw the chain tensioner.
4. Slacken off the main axle-nuts and remove wheel (if tab-washers are stuck, they will normally come loose if you tap the wheel gently from side to side). To get the tyre past the brake blocks, either deflate the tyre or remove the LH brake block.

Re-fitting (with hub-gears, make sure that the tab-washers engage correctly in axle-plate):

1. With the chain in place over the (outer) sprocket, drop the axle into the axle-plates (the correct way round if it has “handed” tab-washers).
2. Make sure the drive-chain isn’t trapped, and secure the wheel nuts over the washers.
3. Fit the chain-tensioner (with a derailleur, the fixed-idler-wheel must lie between the two plates of the actuator). Secure using the chain-tensioner-nut and washer, but don’t overtighten the nut.
4. Feed the chain over the idler-wheels on the chain-tensioner, and check chain flow.
5. For hub-gears, if present:
 - a. screw the gear-indicator-rod right into the axle, backing off not more than half a turn to align it, and connect gear-indicator-chain to the cable-anchorage.
 - b. Adjust the gears and make sure that all 3 gears are engaging OK.
6. For derailleur gears, if present, check function and adjust with M4 grub-screws in actuator if necessary.
7. If you removed a brake-pad, re-fit it.

Full details for wheel removal and re-fitting are in the Owner’s Manual.