



FITTING A REPLACEMENT DERAILLEUR CABLE

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.
- also, if the cable you are replacing is 4mm, *without* any fitted ferrules, this replacement cable with 5mm ferrules will not fit the cable-stops: contact Brompton to obtain the correct cable stops (or alternatively carefully drill the bores of the cable-stops to 5mm).
- 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: you may find that the summary instructions on the final page are a useful guide (full details in the Owner Manual).

subtext dr cab trig rem

Disconnecting 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needed), and withdraw the cable: *take care not to lose the threaded nipple, which can drop out the moment the cable is withdrawn.*

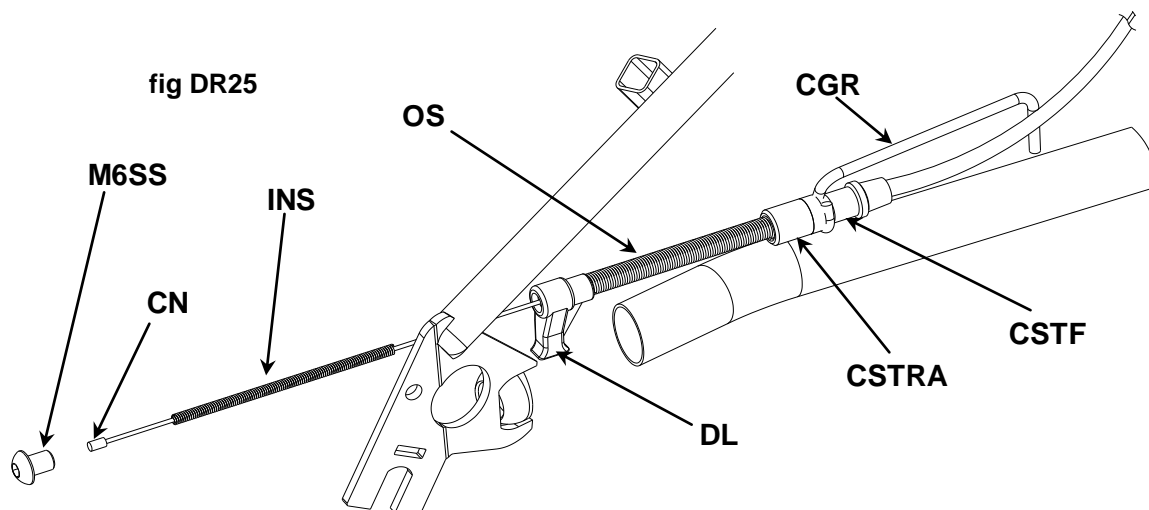
subtext dr cab rem

Disconnecting the derailleur cable lower end.

Down on the rear frame, fig DR25, the "dog-leg" DL should be left connected to the actuator (CHPUA, not shown in this view). If 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).

It is a good idea to clean up the area where the derailleur cable ends, particularly the right hand chainstay tube, and cable guide, this to avoid getting dirt into the cable on reassembly.

With the cable disconnected from the lever, the next step is disconnection from the DL. The screw M6SS in the back of the DL has to be undone (4mm hex key), but before doing so, the pressure exerted on it by the inner spring, INS, acting through the cable nipple, CN, must be removed (otherwise the thread cut in the back of the DL may be damaged). To relieve this pressure, you have to pull forwards on the inner cable, which compresses the spring. So, leaving the forward cable stop, CSTF, in place, move the outer cable forwards about 50mm, which exposes the inner cable: grip the inner cable with pliers at a position approx. midway along the cable guide CGR, and pull forwards a



bit to compress the INS. Undo and remove the screw M6SS, and then allow the pliers and cable to

move rearwards till the spring is relaxed (note: if you intend retaining the inner cable, take care not to kink it with the pliers).

Remove the inner cable.

Remove the outer cable and fit the new one: the routing should be exactly the same as for the original (fig CR1): in front of the handlebar, to the left of the h'bar stem, through the ring on CABGATH, through the CGC, inside the tube TT, and outside the forward leg of the cable guide CGR. The derailleur cable should lie below the other rear cable(s).

subtext dr cab fit

Connecting the derailleur cable lower end.

With the inner spring INS in place on the cable inner, feed the cable inner through the back of the dog-leg DL, through the cable stops CSTR and CSTF and up through the cable outer, until most of the spring has passed into the dogleg and come to a stop. Move the outer cable forward so that its rear end lies about 50mm in front of the forward cable stop CSTF (this last still in place in the loop on the rear cable guide CGR).

The next step is to fit the screw M6SS to the back of the dogleg, but first the inner spring INS has to be compressed. Carefully grip the exposed part of the inner cable with pliers, just in front of the CSTF, and pull forwards until the spring is compressed (with the cable nipple well inside the dogleg DL): feed the screw in and do it up. Do not overtighten this screw but make sure that the underside of the crew head touches the plastic dogleg DL.

Slide the outer cable back till it engages inside the CSTF, right in till it comes to a stop.

subtext dr cab trig fit

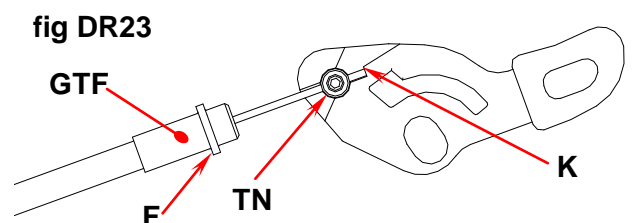
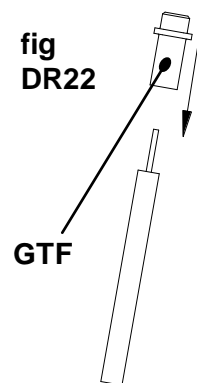
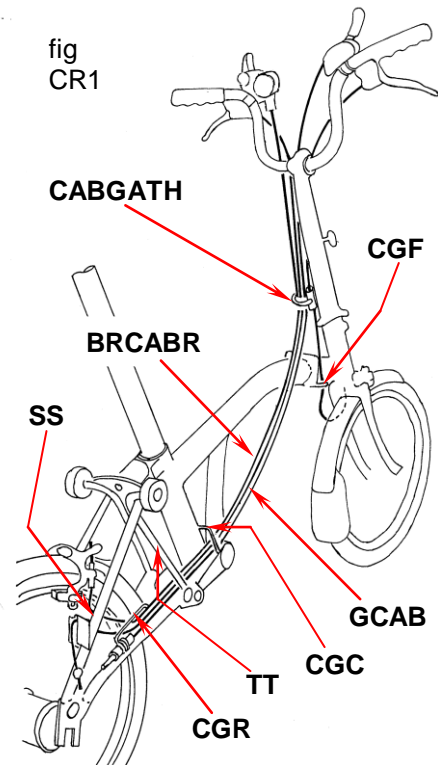
Connecting the cable to the trigger.

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 cable-stop 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.

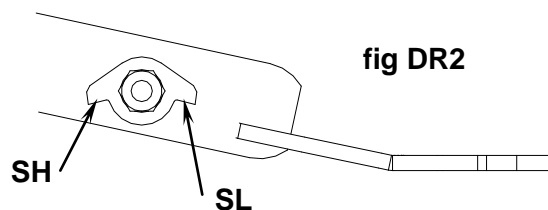
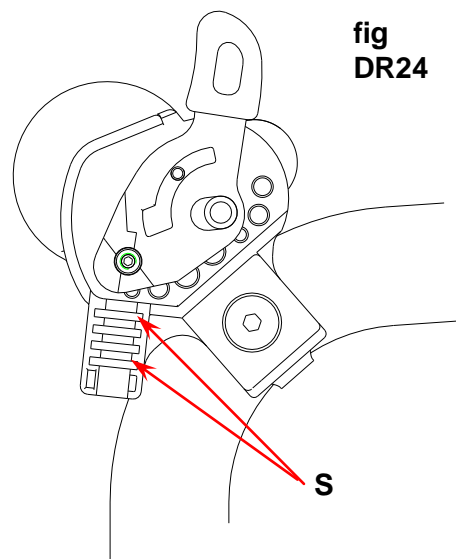
If an appropriate slot for the GTF cannot be found, the cause may be a) that the cable outer is not seating correctly in the CSTF or in the GTF, b) that the CSTF is not bearing against the loop in the CGR, or else c) that the cable supplied is the wrong length (the inner (excluding the nipple) should be 124mm longer than the outer).

Checking that the cable is set OK in 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.

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.



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.

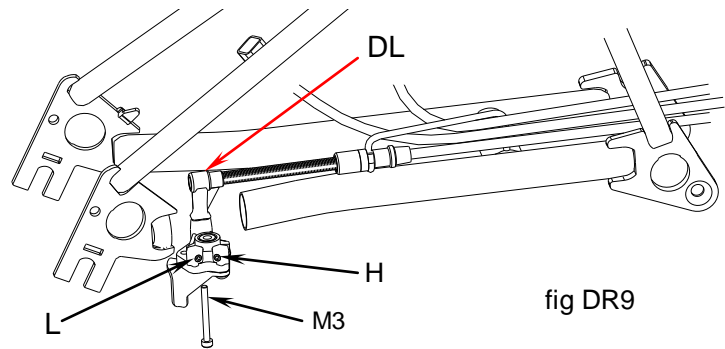


fig DR9

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.

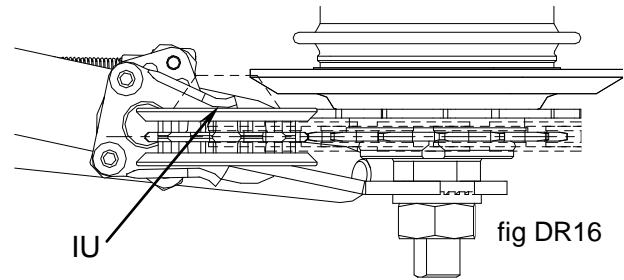


fig DR16

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.

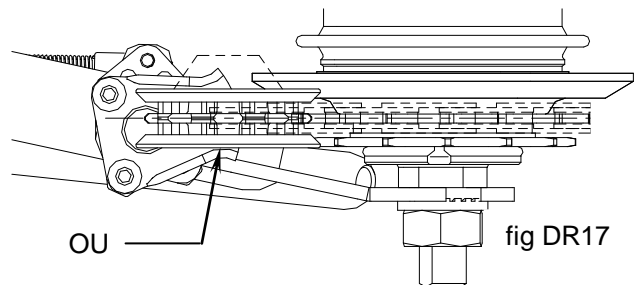


fig DR17

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

SUMMARY OF DERAILLEUR CABLE CHANGE.

1. Remove rear wheel.
2. Disconnect the cable at the trigger. Take care not to lose the small parts here.
3. Down on the rear frame, move the outer cable forward to expose the inner cable.
4. Undo and remove the M6 set-screw (3mm hex key) at the back of the "dog-leg", but, **to avoid damage to the threads** while doing this, relieve the spring pressure by gripping the inner cable with pliers and pulling forwards.
5. Check that the actuator is rotating freely between its stops (now's the time to rectify if there's a problem).
6. Remove old cables and fit the new ones (the inner cable passing through the override spring). Route the outer cable the same as originally, but, temporarily, leave some of the inner cable exposed at the lower end.
7. Fit the set-screw back in the dog leg, again gripping the inner cable (with care to avoid damage) and pulling forwards to compress the spring. Do not overtighten the set screw: it should end up recessed in the dog-leg by about 2mm.
8. Move the outer cable backwards to engage in the cable stop.
9. Connect the top end of the inner cable to the lever, but **don't forget to have the cable ferrule in place** on the outer cable **first**. While clamping the inner cable in the threaded nipple, the cable end should abut the special "step" in the lever moulding.
10. Fit the lever to the trigger, selecting the correct slot for the ferrule, and fit the cap to the trigger.
11. Check that the cable setting is OK.
12. Fit the rear wheel and check function, finally resetting stop(s) if needed.

subtext rw summary

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 as follows: 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.