Astra G Cabriolet Roof Front Latch Repair

Taken from http://www.astra-cabrio-forum.de/thread.php?threadid=27142

Full credit goes to "JR__" for the original work.

English language version by Mike Ellis, 13th February 2016

The Problem

The Astra Convertible roof front edge is held closed by two metal latches. These latches are driven by a centrally mounted electric motor and a pair of sliders on a worm-gear. These sliders are made of plastic and are prone to sheering. When this happens, the roof can no longer be opened or closed. If the roof is fully closed, opening it can be tricky, and unfortunately this is the first step to repairing.

The Repair

JR__ came up with a really neat and strong repair, replacing the weak plastic block with a metal unit. Unfortunately the original plastic block runs on a wormgear with a very peculiar thread, so rather than having this tapped directly into the repair, the original block is cut down to fit inside a "cage". This clever step keeps the cost of the repair much lower – the two cages can be made for about £30 in a local workshop, but tapping the thread would cost about £100 each. The two latches are slightly different as the left-hand latch also includes the Hall-effect position sensors which allow the roof ECU to decide when the latch is fully open, fully closed, or in transit.

Step 1 – Partially open the roof and remove the cover

To remove the plastic cover, you need the front edge of the roof to be unlocked and then position the roof mid-way through the opening cycle such that the front edge is positioned vertically. This is the only way to get to the screws that hold the front edge cover in place. If the roof can't be got to this position manually or electrically, I fear you're going to have to cut away the plastic cover. These instructions assume that the roof is closed but can be opened manually – if you're starting from a different position, you'll have to modify the steps appropriately.

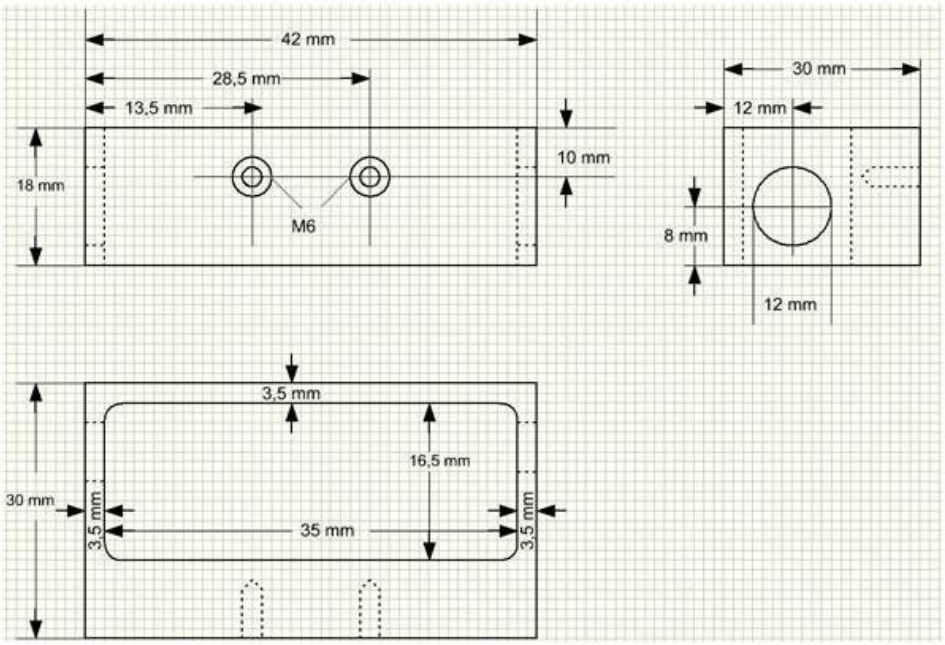
1. **Lower the windows**
2. Use the hex tool through the hole in the centre of front edge of the roof to "undo" the roof latches. This takes a lot of turns! At the end, the front edge of the roof should be about 10cm above the windscreen. When you reach the end of the cycle, the mechanism should feel a little bit stiff. Do NOT force it – this is the easiest way to get the latch blocks to sheer!
3. Lift the rear edge of the rear window as far as possible.
4. In the boot, push the emergency release lever forward and hold it there.
5. **Close the boot**
6. Open the tonneau cover. Do NOT try to open the cover and the boot lid at the same time – this will damage both panels.
7. Use the Vauxhall supplied plastic clip to hold the cover open – or find some other way to hold it in position
8. Lower the rear window edge
9. Gently push the front edge of the roof backwards, stopping when the front edge of the roof is vertical. Find a way to secure the roof in this position – it should pretty much stay there, but be safe.
10. On the closing face of the cover there are four crosshead screws holding the cover in position. Remove these screws.
11. About halfway along the vertical section of the roof side rail, there is a T25 Torx screw (one each side) holding a check strap for the outer roof fabric. Remove these two screws to allow the roof fabric to be moved.
12. Between the inner and outer roof fabric, on the rear edge of the plastic cover, there are nine small crosshead screws. Remove these with a stubby screwdriver.
13. The plastic cover should now be easy to remove, revealing the mechanism underneath. The front latch mechanism comprises a central motor, two flexible drive shafts, and two latch mechanisms.

Step 2 – Make the cage(s) and sensor probe

Once you have determined that the block has broken, and before doing anything more on the car, get the cage(s) and sensor triggers you need ready.

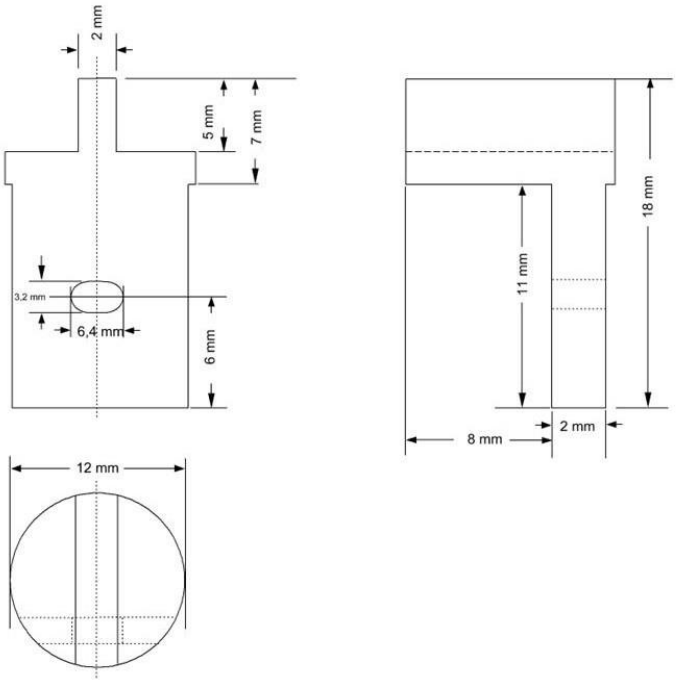
Cage

This is the dimensioned drawing for the cage – one of these is required for each latch you want to repair. Note that the diagram does NOT include the tapped hole required on the left-hand latch to mount the sensor trigger. The cage is best made in aluminium or other non-magnetic material.



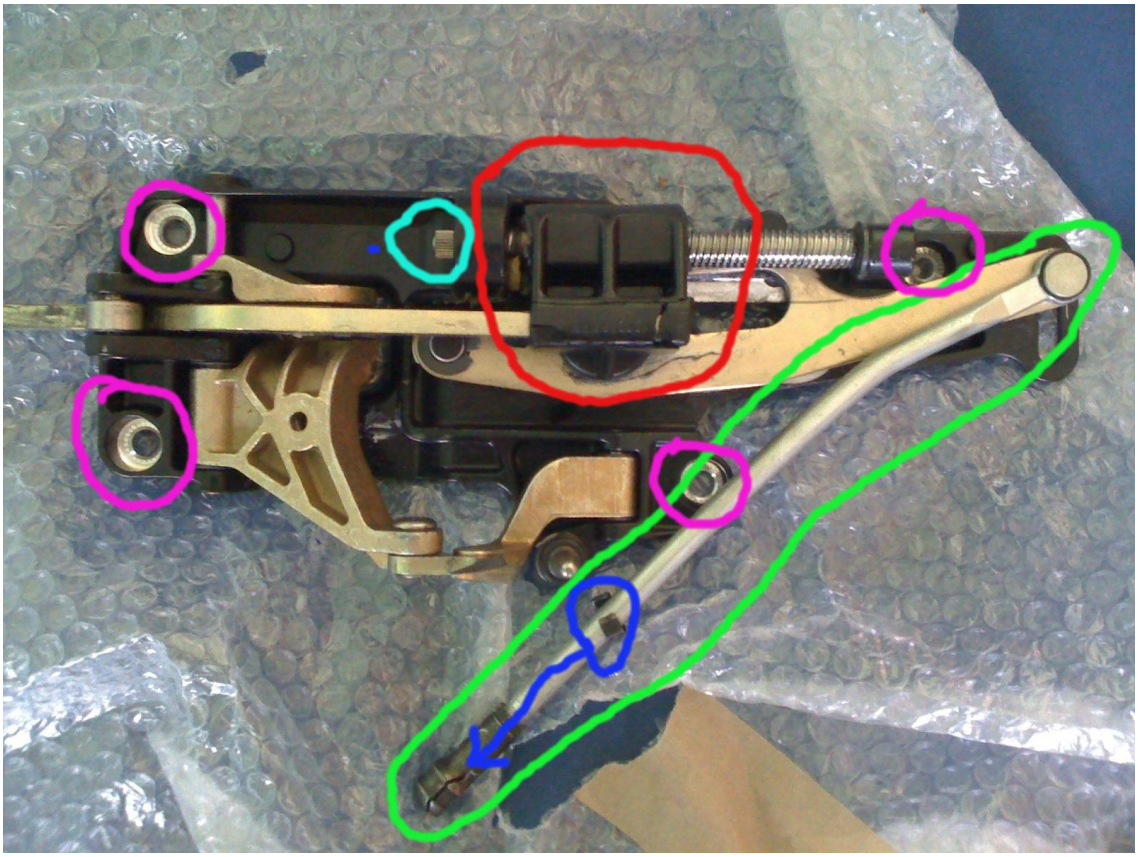
Trigger

This is the trigger for the Hall-effect sensors – only needed on the left-hand latch. It must be made from a magnetic material – i.e. steel not aluminium.



Step 3 - Remove the latch

The latches include the push-rods (green) which drive the forks on the side arm which “flip” open the front edge of the roof. In the middle of the latch mechanism is the plastic block (red) which is prone to breaking – the one in this picture is cracked and will probably break soon.

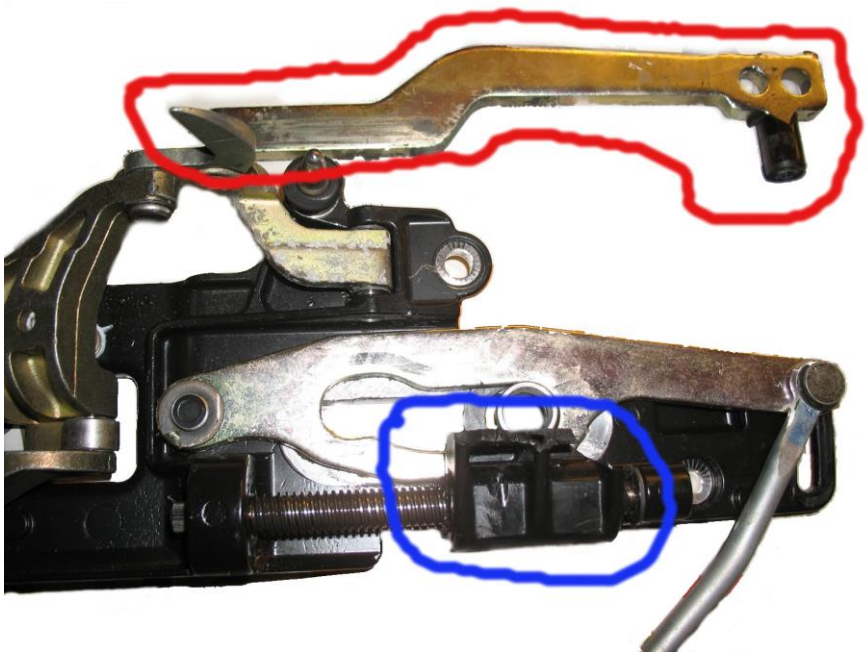


You will need to remove the latch from the car to repair it. To do this:

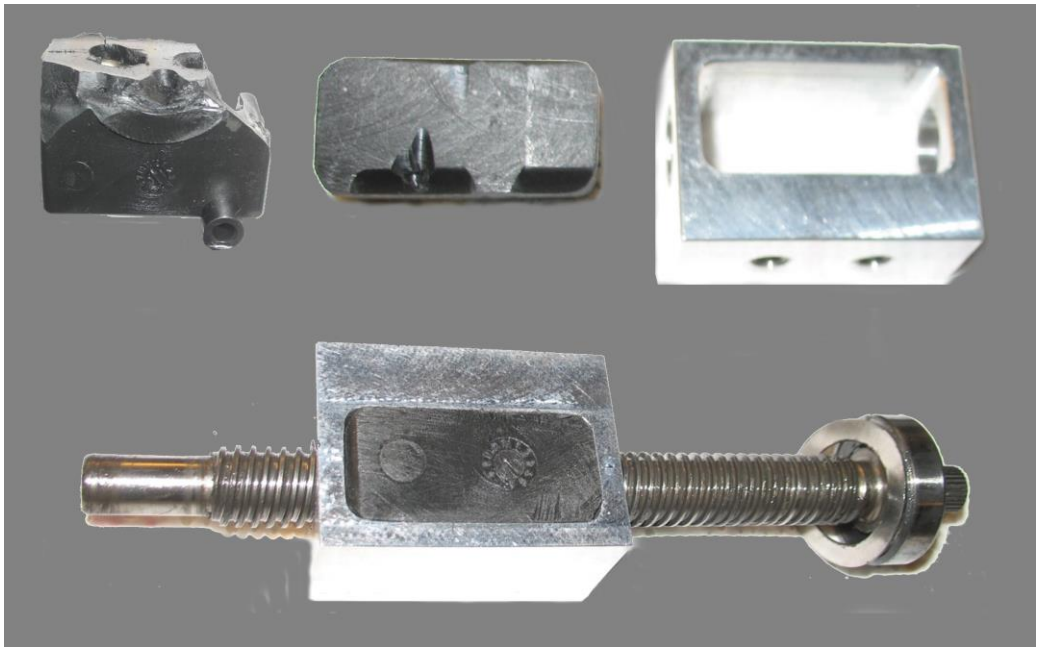
1. Unplug the two Hall-effect sensors (left hand latch only – not shown). The connector is near the motor and has a small clip which needs to be lifted before it can be removed.
2. Remove the retaining clip (dark blue) from the grooves at the end of the pushrod using a screwdriver to slide it out of position.
3. Pull the splined drive shaft free from the splined worm gear shaft (light blue).
4. Undo the three four retaining bolts (magenta).
5. Remove the latch from the vehicle.

Step 4 – Repair the latch

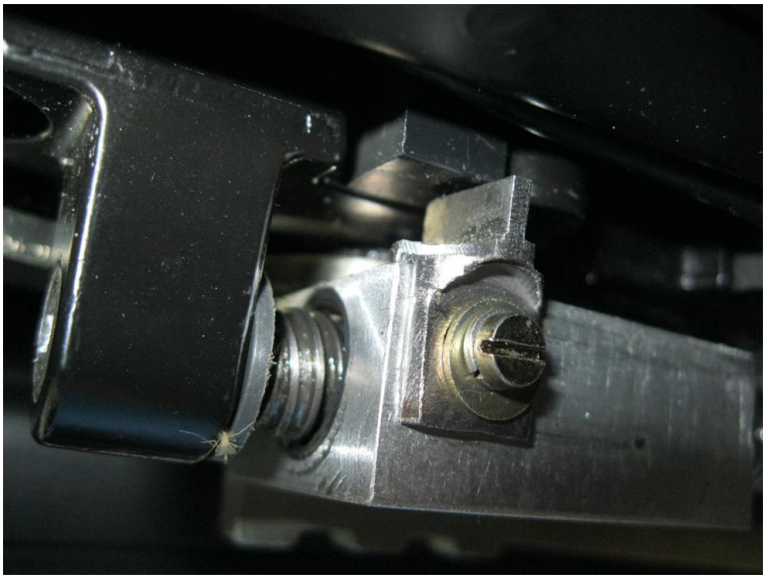
You need to remove the worm gear shaft and slider mechanism from the latch by removing the circlip on the shaft near the splined drive, and removing the crosshead screw from the underside of the slider carrier. The latch should then come apart quite easily, the objective being to remove the slider (red) and the remains of the block (blue). Remember that you need to re-use the threaded part of the block, so don't just smash it! In this picture, the block had broken completely, so the slider could be removed without taking the worm gear out, but you will need it out later on anyway, so you might as well take it out now.



The next step is to cut the threaded portion of the block down until it will fit into the cage, such that the worm gear will eventually thread into the complete assembly.



Once the worm gear is put back into the latch (don't forget to grease it lightly!), the two tapped holes in the cage should be lined with the two holes in the slider and secured with a pair of short M6 bolts – don't forget the Loctite! On the left hand latch only, you will also need to fit the trigger for the hall sensors. Take care to mark where this needs to go, then drill and tap a hole to allow a bolt to be used to secure it as below. The Hall sensor is the small black cube just above and to the left of the metal tab in the picture.



Step 5 – Refit the latch

Re-fitting the latch to the car is the reverse of removal. Before connecting the flexible drive shaft, make sure to set both latches to the same position. Once you think everything is in the correct place, and the wiring has been re-connected, operate the latch mechanism using the hex key with the roof open at least twice over the full range to make sure that the two latches move at the same time. If they don't, remove one of the drive shafts, adjust the latches to the same position, and try again. Failure to get the two latches synchronised properly will result in the mechanism failing to work correctly, and may damage the motor or latches. Once you're happy the latches work correctly, I also recommend manually opening and closing the whole roof twice to make sure that everything works properly. If all checks out, reset the roof and enjoy your newly repaired convertible roof!

Manually closing the roof

Starting from the position of the roof being fully open, this is the sequence to close the roof manually.

1. **Lower the windows.**
2. Open the boot.
3. Push the release lever on the left-hand side of the boot fully forward and wedge it there.
4. Close the boot lid.
5. Open the tonneau cover and use the Vauxhall/Opel supplied plastic clip or some other means to keep it open.
6. Open the roof latches using the supplied hex tool through the grommet in the centre of the front edge. It takes a lot of turns, so be patient, and the latches stop moving a long time before the mechanism has fully opened – the side “flipper forks” move during this time. When fully open, the mechanism should feel a little stiffer, but do NOT force it – this will break the plastic blocks!
7. With a helper, lift the front edge of the roof out of the storage compartment and move it toward the “almost closed” position with the front edge about 10cm above the windscreen.
8. Raise the rear window fully.
9. Lower the tonneau cover.
10. Lower the rear window.
11. Gently close the latches using the hex tool. The first part of the motion should flip the front edge of the roof down using the forks on the side-rails, then the latches pull the roof into the fully locked position.

Manually opening the roof

1. **Lower the windows.**
2. Open the roof latches using the supplied hex tool through the grommet in the centre of the front edge. It takes a lot of turns, so be patient, and the latches stop moving a long time before the mechanism has fully opened – the side “flipper forks” move during this time to raise the front edge of the roof by about 10cm. When fully open, the mechanism should feel a little stiffer, but don’t force it as this will break the plastic blocks!
3. Open the boot.
4. Push the release lever on the left-hand side of the boot fully forward and wedge it there.
5. Close the boot lid.
6. Raise the rear window.
7. Open the tonneau cover and use the Vauxhall/Opel supplied plastic clip or some other means to keep it open.
8. Lower the rear window.
9. With a helper, slowly move the front edge of the roof up and backward until the roof folds into the storage compartment.
10. Close the latches – again, this takes a lot of turns. Make sure the latches are pointing at each other since they will hit the tonneau cover and damage it if they are pointing upwards.
11. Loop about a 1.5m length of string around the base of the tonneau cover hydraulic ram and leave both ends on the left-hand rear window trim – this string will be used to pull the locking mechanism into the locked position when the tonneau cover is lowered.
12. Close the tonneau cover.
13. Open the boot.
14. Remove the wedge from the release lever.
15. Gently but firmly pull on both ends of the string – you should see the front edge of the tonneau cover pull down slightly and here a “clunk” noise as the latches engage fully.
16. Check that the tonneau cover is securely locked – driving with the roof down and the cover unlocked will cause significant damage as the cover will open into the wind.
17. Pull on one end of the string to remove it from the mechanism.

Resetting the roof

Use the opening and closing instructions above to get the roof to the stage where:

- The front edge is unlocked and about 10cm above the windscreen
- The rear window is vertical
- The tonneau cover is closed but not latched
- The release lever is NOT wedged

The roof is then reset simply by starting the engine and holding the “close roof” button until the roof is fully closed.

Refilling the hydraulic fluid

The hydraulic fluid reservoir is part of the pump located in the boot on the right hand side behind a cover near the rear lamp cluster. The level should always be checked with the roof fully open as it will look low if the roof is closed.

Most people have noticed that the refilling port is located in line with the “minimum” level marker. Fortunately the system is completely sealed, so loss of fluid is rare, but if you’ve replaced a hydraulic hose after a burst, you will need to replace the lost fluid. But the port is below the minimum level, so how do you do it? Well, there are three ways:

1. The Vauxhall/Opel way – remove the pump, tilt it, refill it, refit it. Not a great method.
2. Jack the rear corner of the car up to cause the fluid to tip. It works, but you have to jack the car up a LONG way to do this.
3. Use a syringe to add fluid when the roof is completely closed, then replace the sealing bolt and open the roof to check the level. It should have risen slightly and now be just about on the minimum mark.

Note that the whole system is self-bleeding, so if you’ve lost a lot of fluid, you may need to top up the fluid several times before all the air is purged from the system. If a lot of fluid has been lost (e.g. replacing an entire hydraulic ram with both hoses) then the roof may stall partway through the opening or closing cycle. Don’t panic – this is normal. Simply complete the cycle manually (as above) and add some more fluid, then try again. It might take half-a-dozen attempts before you’ve got enough fluid in the system after changing one ram, even more if you’ve changed several.