

## Taking the door apart and preparing it for paint

'87 S4 Automatic

My car developed some visible aluminum corrosion on the driver's side door and front fender:



I decided to have the car repainted but the guy who will paint it is very reluctant to address the aluminum, so I took the aluminum parts to a specialist (Radboud Restoration in Oudkarspel, The Netherlands).

How to take a door apart and transform it into an empty shell so I can have the aluminum repaired and send it off for paint?



The first job was of course to dive into Rennlist and search for -> read into -> subscribe to all relevant threads. There were a lot very useful threads with useful links but I kept switching and going back and forth so I decided to gather all the info I could get and 'pour' it into one write-up so I could rebuild my doors a lot easier when they are finished. I also looked at the WSM for reference. Here's the result....

Before I start I think it's only fair to give credits to all the thread starters and fellow Rennlist members who allowed me to gather all that information in the first place. So a big thank you to (in random order) Stan (Mrmerlin), Alan, b9boy, Speedtoys, Wisconsin Joe, Chris (z driver 88t), jpitman2, RET, Ad0911, Kiln\_Red, Dean\_Fuller, boomboom, Landsharkoz, Andy Evangelides, MrLexse, 928.jorj7.com, StratfordShark, SeanR, dr bob, NoVector, Rob Edwards, Roger Tyson and anyone I forgot to mention....

This write-up will contain the following chapters:

1. Removing the door
2. Mirror
3. Armrest and door panel
4. Door frame lining
5. Wiring Harness
6. Window Motor & lift mechanism
7. Window guide tube, slides & felt guides
8. Glass
9. Door lock mechanism, door handle & door support
10. Window rubbers & trim
11. Rub Strip & sill cover
12. Glue and adhesive tape

I narrowed my write-up to the driver's side door. Unfortunately not all pictures were good enough so in some cases I used a picture from the passenger's door and mirrored it for easy reference; where that just wasn't possible I specifically mentioned that it is the passenger's door.

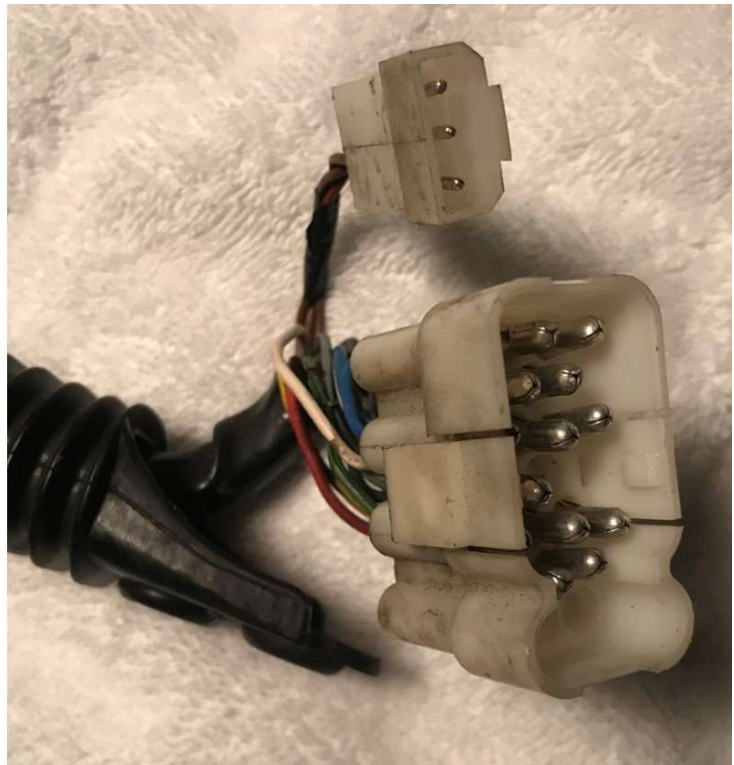
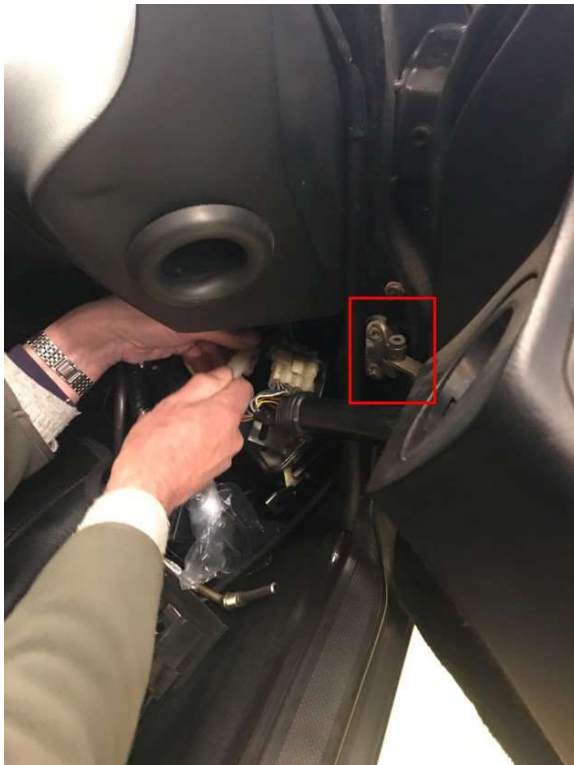
Another thing to mention is that I had the door lying flat on the kitchen table, enabling me to walk around it and not having any tension on the door from it hanging on it's hinges. Unfortunately that might make some of the things I did not as suitable for anyone who has the door still attached to the car.

And before you start printing or copy-paste it all: I'll try to post a PDF file at the end... ☺

## 1. Removing the door:

First disconnect the wiring harness: there are two connectors that easily disconnect.

Next remove the pan-head screw that connects the door support to the bracket on the body.



Model	Year	MG	SG	Illustration	Restrictions	UPD	19:34	23.01.2010	PORSCHE	PET	PORSCHE
928	1991	8	04	804-05		248					

Pos	Part Number	Description	Remark	Qty	Model
		installation parts for door			
		differing parts for cars with alarm system see group 8/04/20			
1	928 537 581 03	rotary knob		2	
2	911 531 703 00	cap		2	
3	928 537 585 02	bearing shell		2	
4	999 218 010 02	oval-head screw M 5 X 12		2	
5	N 011 665 3	washer B 5,3		2	
6	928 537 096 02	bearing		2	
7	993 531 563 00	linkage clip		2	
8	N 013 968 7	tapping screw B 4,8 X 13		4	
9	928 537 033 04	door support		2	
10	N 011 524 7	washer A 6,4		4	
11	928 537 451 02	pan-head screw		4	
12	928 537 371 02	desk pad		2	
13	928 537 419 03	pan-head screw		2	
14	928 537 417 02	bearing bracket	/L	1	
(14)	928 537 418 02	bearing bracket	/R	1	
15	928 537 425 02	desk pad	/L	1	
(15)	928 537 426 02	desk pad	/R	1	
16	928 537 459 02	oval-head screw M 6 X 25		4	
17	928 537 907 03	lock inner part	/L	-88 1	
(17)	927 537 908 03	lock inner part	/R	-88 1	

Unscrew the 6 allen head bolts: 3 per hinge.

Model	Year	MG	SG	Illustration	Restrictions	UPD	19:34	23.01.2010	PORSCHE	PET	PORSCHE
928	1991	8	04	804-00		248					

Pos	Part Number	Description	Remark	Qty	Model
(1)	928 531 005 10	door in white prepared for mirror	/L	1	
	GRV	prime coated			
(1)	928 531 006 10	door in white not prepared for mirror	/R	1	
	GRV	prime coated			
(1)	927 531 005 10	door in white not prepared for mirror	/RL/L	1	
	GRV	prime coated			
(1)	927 531 006 10	driver's door prepared for mirror	/R	1	
	GRV	prime coated			
2	928 537 345 03	door seal	/L	-90 1	
2	928 537 345 05	door seal	/L	91 1	
(2)	928 537 346 03	door seal	/R	-90 1	
(2)	928 537 346 05	door seal	/R	91 1	
3	N 014 770 3	pan-head screw M 8 X 16		12	
4	900 025 007 02	washer A 8,4		12	
5	999 523 102 02	lock washer 8		12	
6	928 537 341 02	thrust wedge	/L	1	
(6)	928 537 342 02	thrust wedge	/R	1	
7	900 144 008 02	counters. head tapp. screw B 3,5 X 9,5		2	
8	928 531 601 03	reinforcement reinforcement		2	
9	928 531 235 03	threaded piece		1	
10	N 013 295 1	tensioning sleeve 3 X 12		1	
11	928 537 723 02	dummy plug		2	



Unfortunately almost all the bolts where 'rounded out', so I had to use a bolt extractor to get them out. These extractors work perfectly and they came out in no time....!



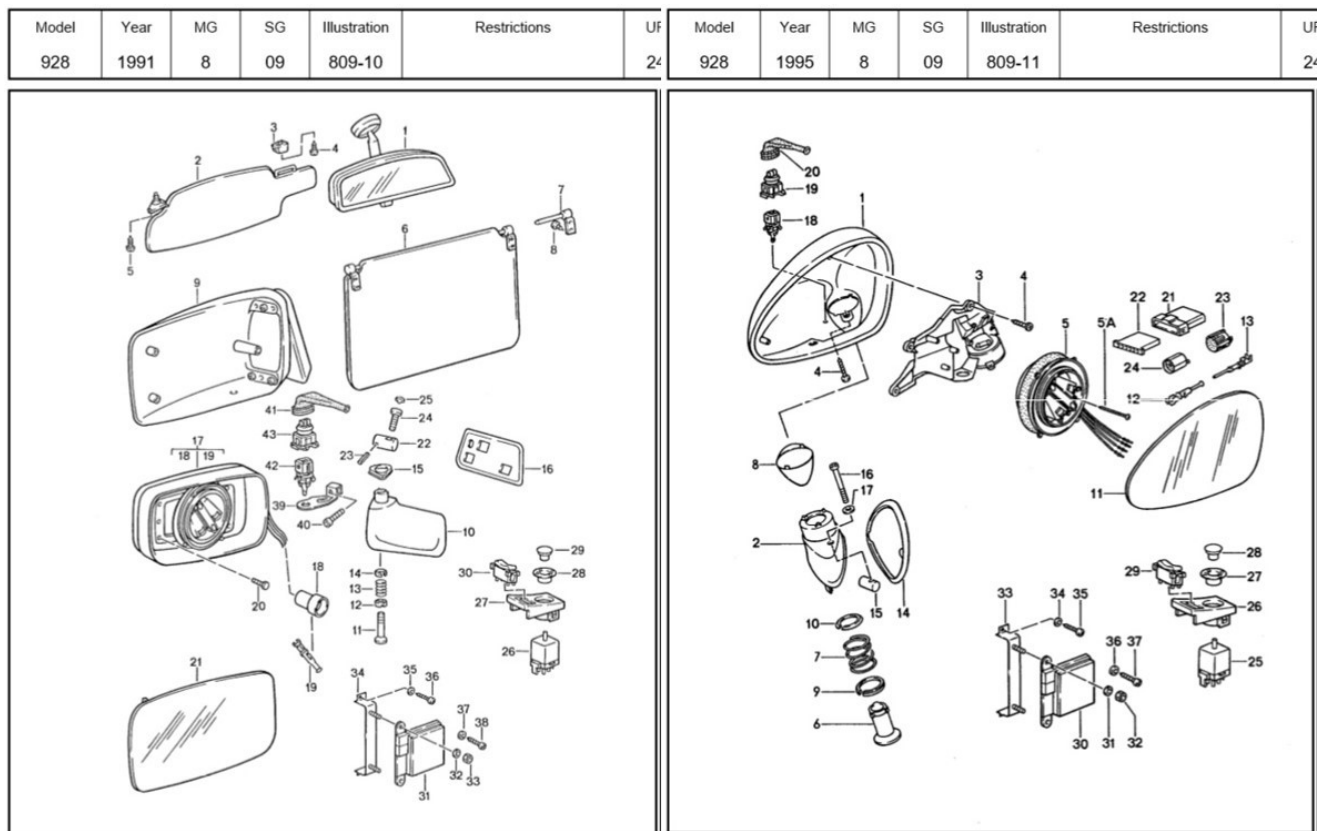
We used a floor jack to hold the door during unbolting, and 3 guys to lift it off the jack after it was loose. Pretty proud to have it on the table....:-)



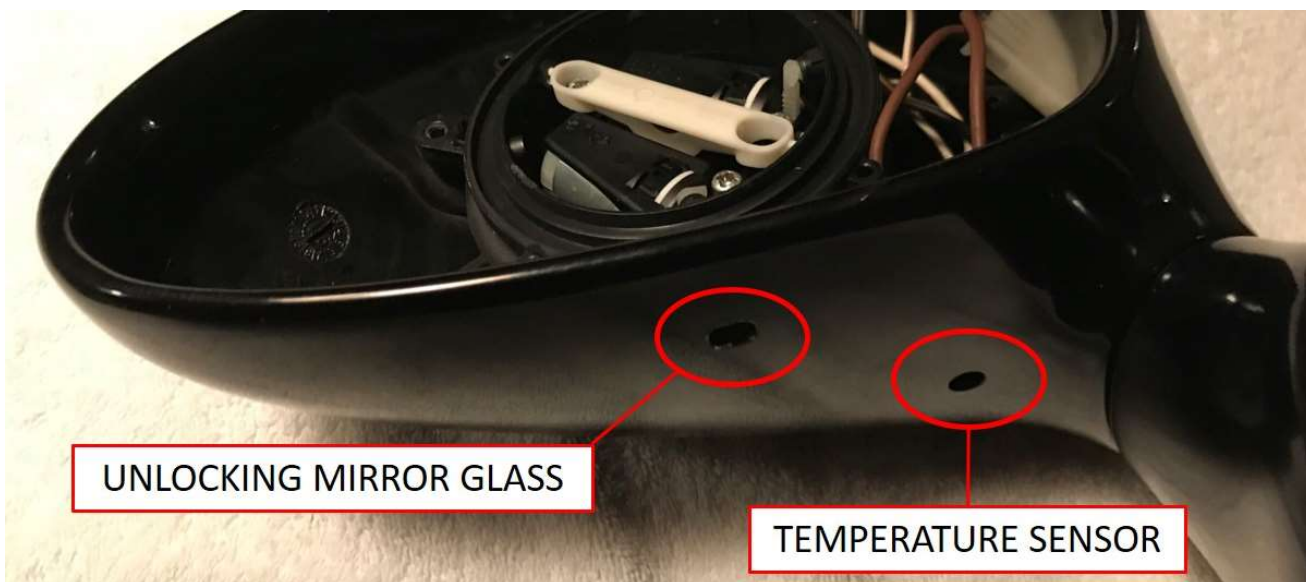
## 2. Mirror:

My car has aero mirrors, so this write-up describes how to remove this type of mirror. There is however an excellent write-up on flag-to-aero conversion by Andy Evangelides:

<http://www.928intl.com/repair/gtsmirrors/aeromirrors.pdf>

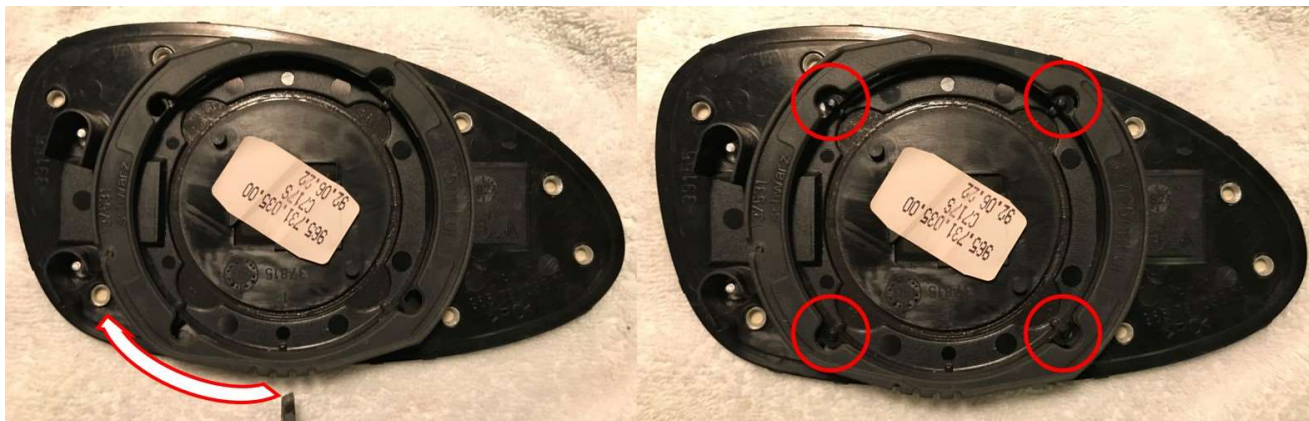


There are 2 holes on the bottom of the aero mirror: one for unlocking the glass and one for the "outside temperature sensor". That sensor is for cars with a digital dash only, so my '87 doesn't have it.





Unlock the mirror glass using a flat screwdriver to turn a plastic ring inside the mirror housing. This will release 4 pins and allow you to take out the glass.



Before pulling the glass all the way out make sure to remove the heater plugs from their pins:



Disconnect the 6-pin connectors inside the mirror housing:

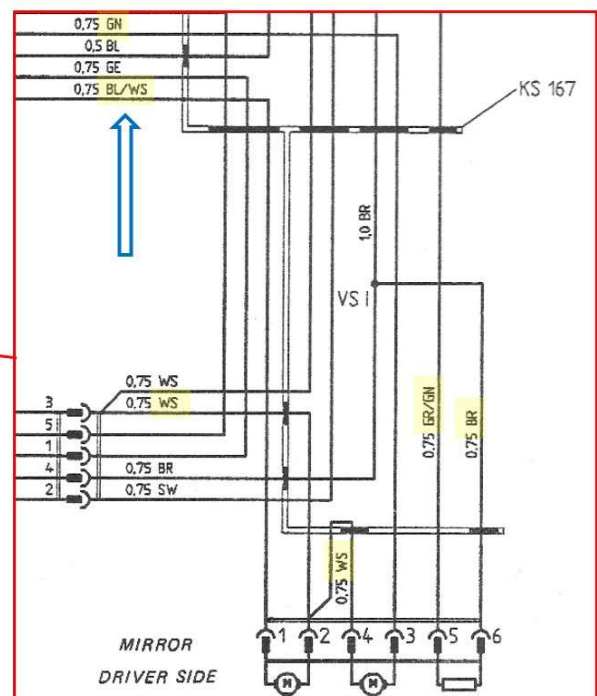
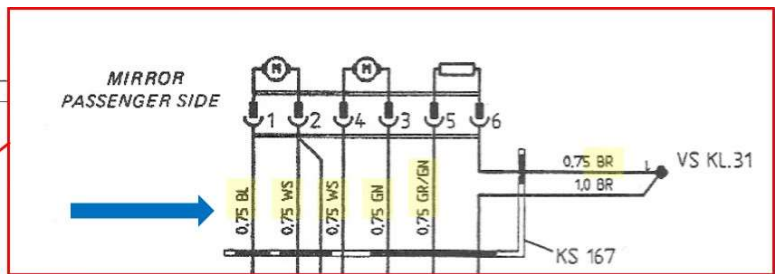
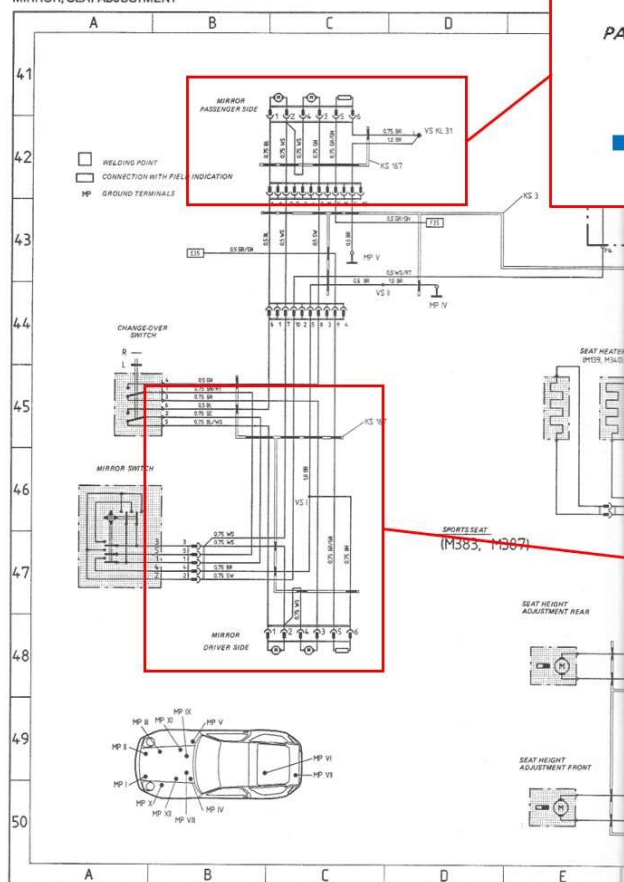


Make sure to mark the different colors on the connector for an easy install later on. Then push the pins out of the connector to enable you to pull the wiring harness into the door without having to cut any wires. We used this device on the right in the picture below; it has a hollow copper end and a spring inside the hex-shaped piece, allowing you to push the pins out without damaging them:



The pictures above are from the passenger's side mirror as it has a blue wire on pin nr. 1; the mirror on the driver's side has a blue/white wire on pin nr. 1, as can be seen in the diagram below:

Wiring Diagram Type 928S Model 87 page 6  
MIRROR, SEAT ADJUSTMENT

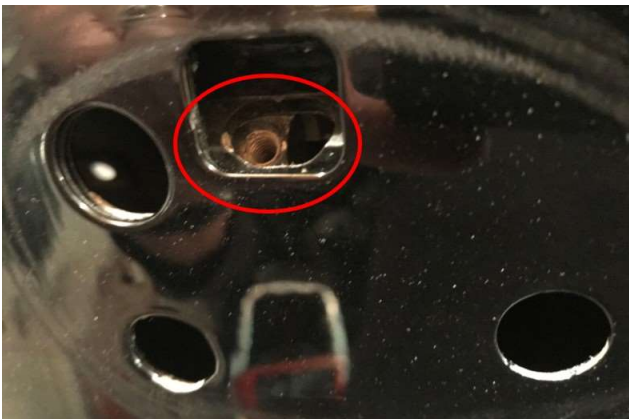




Push the mirror out to reveal a slot with an allen bolt in it. Unscrew the bolt and the mirror will come loose from the body:

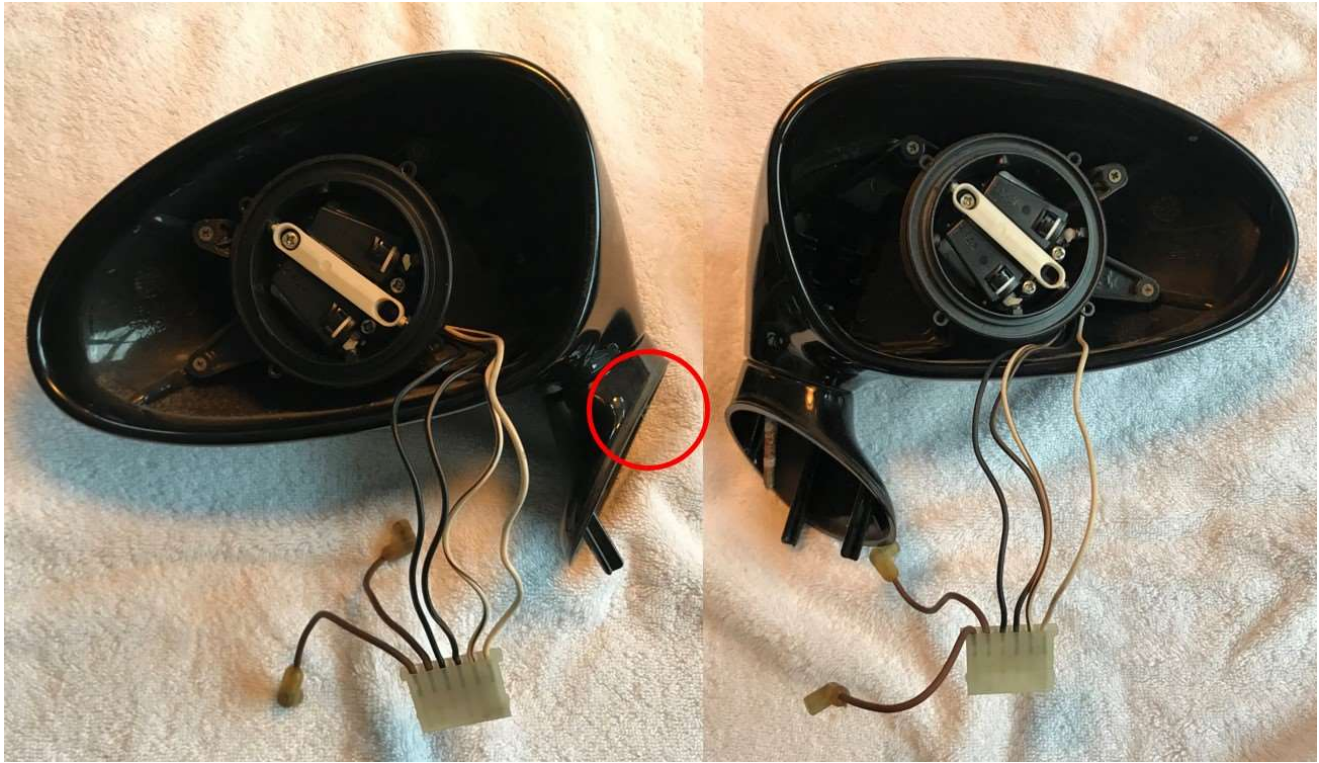


The allen bolt sits in a round threaded piece that is secured from behind by a tensioning sleeve. You can check them out in the PET picture at the beginning of this chapter: nr. 22 and 23 on the left side (the Flag mirror part):





Here are the mirrors on the kitchen table. Unfortunately one of the rods snapped of the mirror base, probably a result from an attempt to steal the mirrors of my car quite some time ago. The part is still there, but I doubt it can be glued back on so I msay have to get a replacement:



### 3. Armrest and door panel:

For this first step I relied heavily on the great **Landsharkoz** write up on removing the door panel. Here's the driver's door on the kitchen table:



Below the relevant PET page for reference:

Model	Year	MG	SG	Illustration	Restrictions	UPD	19:37	23.01.2010	PORSCHE	PET	PORSCHE
928	1991	8	07	807-10		248					

Pos	Part Number	Description	Remark	Qty	Model
1	928 555 071 08	door trim panel rooflining rooflining leatherette		1	
	70A	black			
	3MX	burgundy	-90		
	2KA	greyish green	-88		
	5MA	mahogany	-90		
	3KA	marine blue			
	6WG	classic grey	91		
	6YU	cobalt blue	91		
	6WW	magenta	91		
(1)	928 555 071 54	rooflining leather		1	
	KZ2	black	-90		
	LG7	burgundy	-90		
	QC2	greyish green	-88		
	TV1	mahogany	-90		
	TS1	marine blue	-90		
	UD5	caramel	-90		
	UD6	venetian blue	-90		
	4MT	velvet red	-90		
	2WT	slate grey	-90		
	8YR	black	91		
	6XL	classic grey	91		
	9VL	cobalt blue	91		
	6VL	magenta	91		
	M05	matador red	91		
	D35	carrara grey	91		
	J25	sherwood green	91		



First, unbolt the cover holding the cable guide. It's held by 2 screws, one of which is hidden behind the cable guide. Mine only held one screw, probably never put back in by a previous owner:



Remove the screw behind the door handle and slide out the back plate.



Pull the cover carefully towards you. It is held in place with two black plastic clips and mine came out without having to use one of the tools in the pictures below (I had to use these on the panel though...):







There is a small piece of foam behind the cover on the passenger's side but not on the driver's side. It looks pretty old, so I tend to believe it's been there from the beginning:



To remove the rotary knob first take the cap out; I used a small metal hook to pry it out. Next remove the screw and washer and pull out the rotary knob. The bearing shell can then be removed by turning it anti-clockwise.

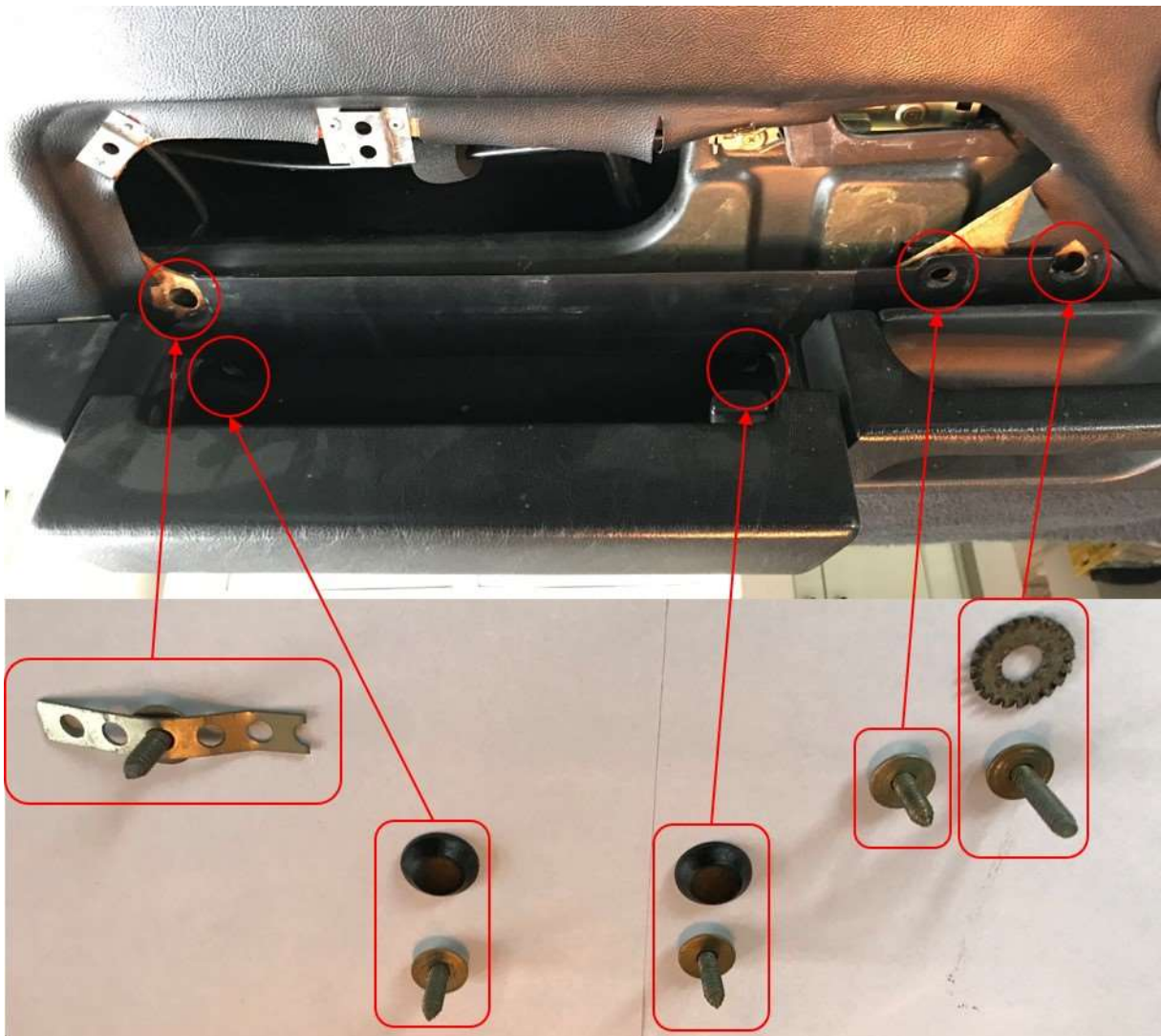




Next step is to remove the armrest. It is held in place with 6 screws; the first one is located behind the rosette of the air vent:



Two bolts are located inside the storage compartment, covered with a plastic cap. One bolt is above the rear end of the compartment, the remaining two are above the handle. As you can see the armrest mounts are damaged: they used a variety of washers to cover the broken off bits:



Take out the mirror switch and disconnect the two connectors from the wiring harness. It comes out pretty easily, but when in doubt just can push it our from underneath when the armrest is loose. While you are at it: take out the light underneath the armrest and disconnect it from the wiring harness:



And off comes the armrest, stored in a specially made crate:



Next job is to take the door panel off.....

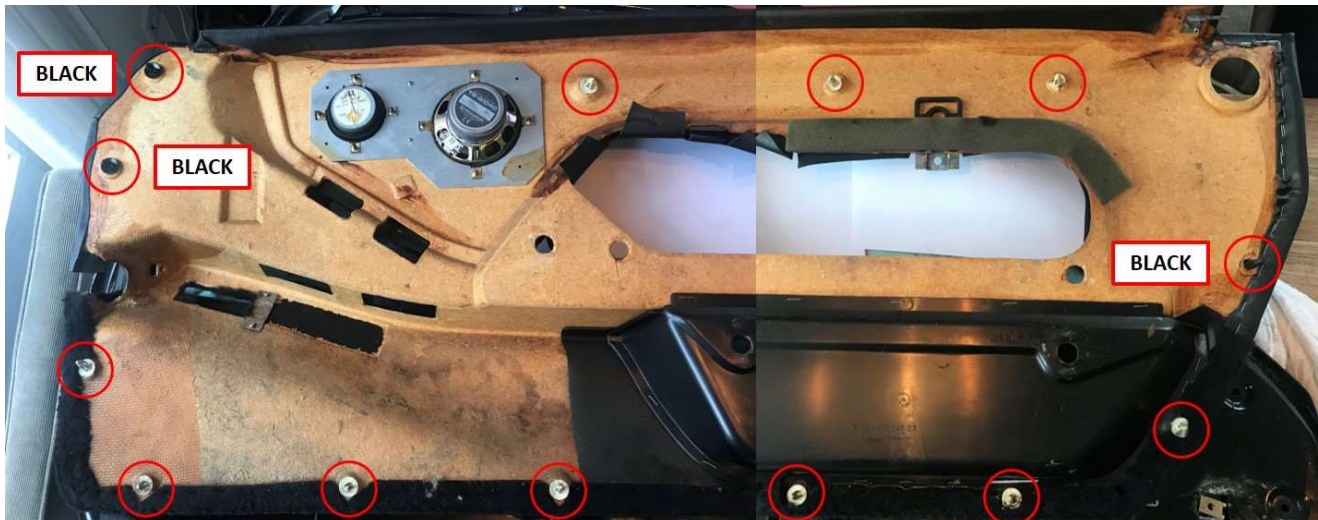


Before you try to release the plastic clips holding the door panel to the door make sure there are no screws in the rear bottom part and rear side. You can check that by running your fingers through the carpet, if there are any you will find them this way. My driver's side door didn't have any although I could feel where they once were in the carpet (the holes are there in the door itself). The passenger's side door did have 2, but the door panel was probably ripped off by a previous owner as the screws were not holding the panel anymore. They are two completely different screws as well, so I don't think the car left the factory with these:



I started at the bottom end of the door using the red plastic tool and one by one popped the plastic clips out; I worked my way to the top of the panel. Many of the clips were damaged so they came out without any resistance.

As mentioned in other threads there is a specific color arrangement of the clips, as shown below:

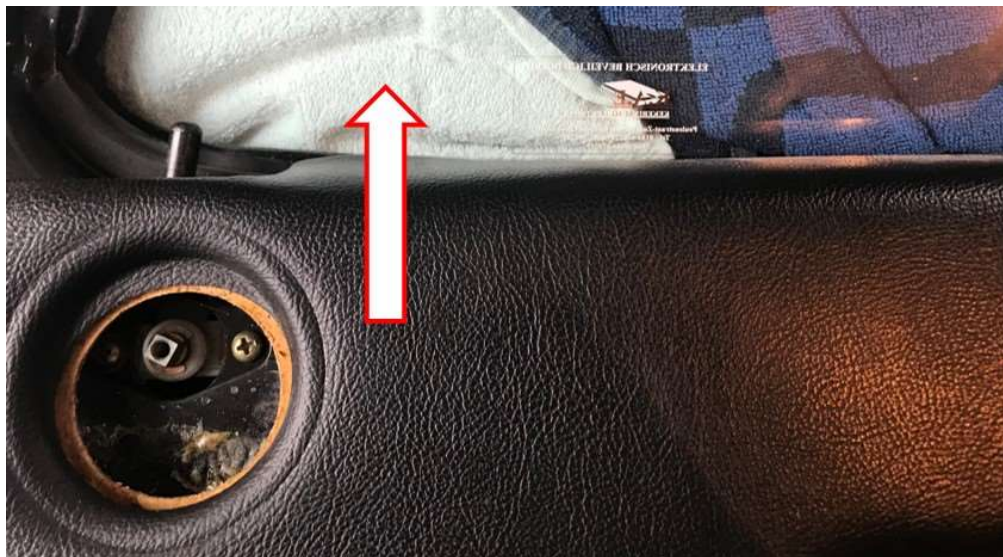


There is a small metal piece that 'locks' the door panel to the door (it sits under the small metal strip that holds the speednut for fastening the inner door frame lining). To remove the panel from the door first move it forward by a few centimeters....

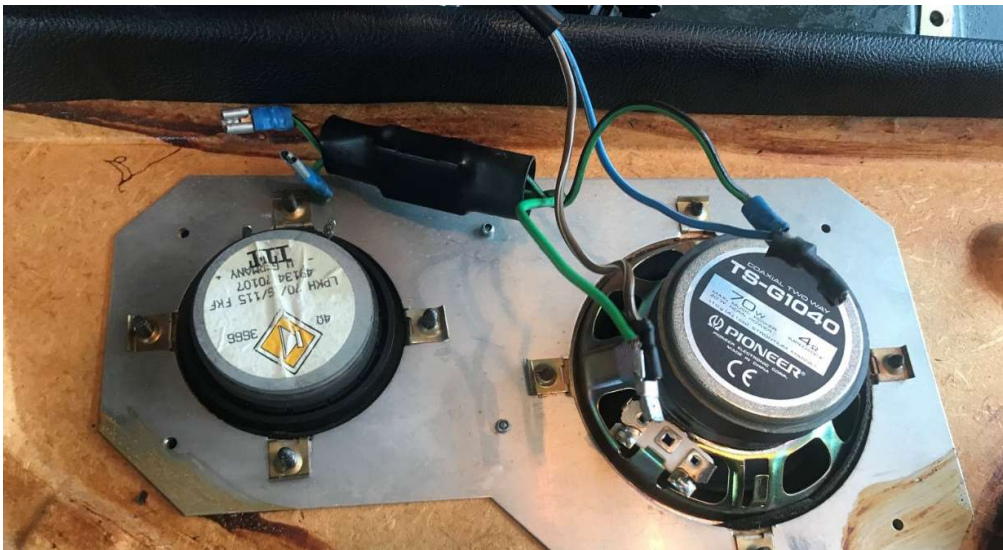




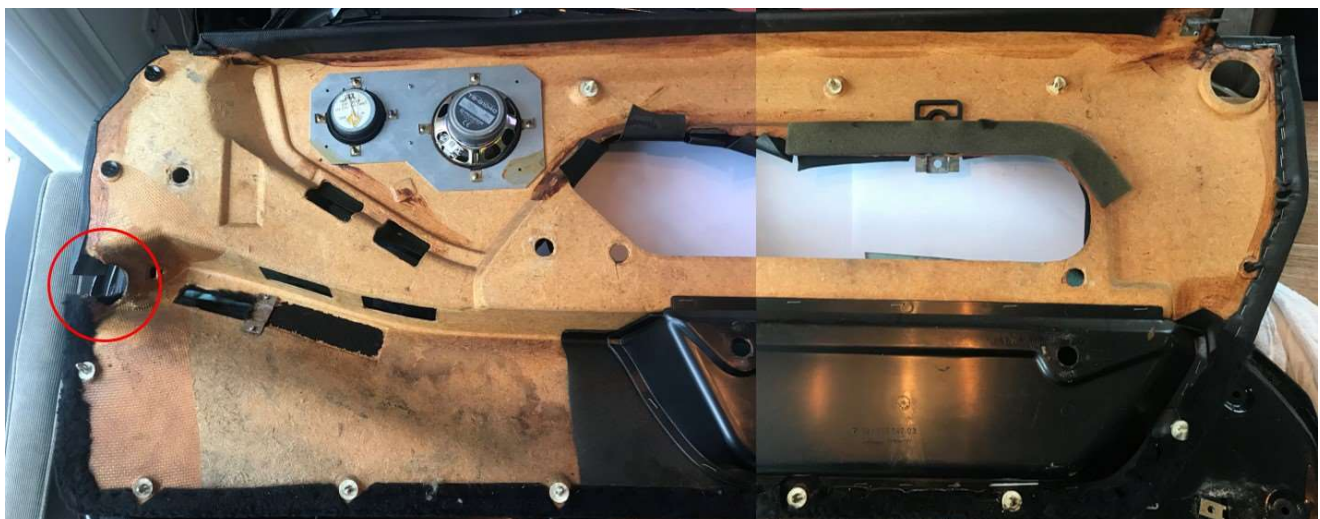
.....then lift it upwards:



Don't pull the panel all the way off: you need to disconnect the speakers from the wiring harness first:



Last thing is to pull the wiring harness through the gap on the left, and it's free:



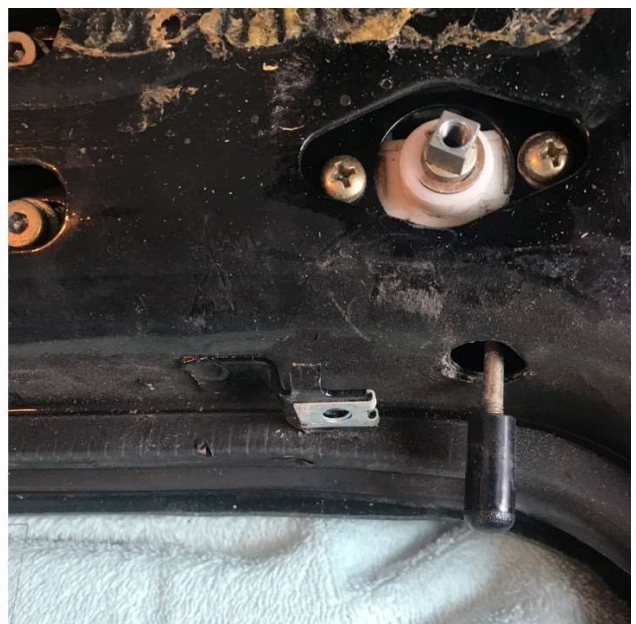


#### 4. Door frame lining:

What I found is that none of my doors had the vapour barrier between door frame and door panel: both were missing. Later on in the write up you'll see some parts that show signs of moisture, so I will definitely make some new barriers when I put everything back together!



The inner door frame lining is attached to the door frame with two screws, one on each side at the bottom of the door frame:







Strangely enough on the passenger's side door the second screw wasn't there, and has never been there!  
After taking the screws out I removed the door seal to be able to stick a plastic tool between the door frame and the lining. At some stage the door seal must have come a bit loose, as sealant was used to have it stick to the door...

I used an angled plastic tool from the outside in to pop the lining from the door frame. I started at one end and moved to the middle, and then did the same thing from the other side leaving the two middle clips on the top for last:



Unfortunately the metal clips are attached through (what seems to be) molten plastic from the frame itself. That has become a bit brittle after all these years, so not uncommon for them to snap off. I had one snap off on each side; luckily I could glue them back on:







## 5. Wiring Harness:

Model	Year	MG	SG	Illustration	Restrictions	UPD	19:43	23.01.2010	PORSCHE	PET	PORSCHE
928	1991	9	02	902-11		248					

Pos	Part Number	Description	Remark	Qty	Model
		wiring harness door			
1	928 612 167 05	wiring harness	/LL	-88	1
(1)	928 612 167 11	wiring harness	/LL	89	1
(1)	928 612 167 17	wiring harness	/LL	90	1
(1)	928 612 167 21	wiring harness	/LL	91	1
(1)	928 612 167 07	wiring harness	/LL	88	1 M537
(1)	927 612 167 02	wiring harness	/RL	-88	1
(1)	927 612 167 06	wiring harness	/RL	89	1
(1)	928 612 167 17	wiring harness	/RL	90	1
(1)	928 612 167 22	wiring harness	/RL	91	1
(1)	928 612 167 03	wiring harness	/LL	-88	1 M537
(1)	928 612 167 09	wiring harness	/LL	89	1 M537
(1)	928 612 167 15	wiring harness	/LL	90	1 M537
(1)	928 612 167 19	wiring harness	/LL	91	1 M537
(1)	927 612 167 00	wiring harness	/RL	-88	1 M538
(1)	927 612 167 04	wiring harness	/RL	89	1 M538
(1)	928 612 167 15	wiring harness	/RL	90	1 M538
(1)	928 612 167 20	wiring harness	/RL	91	1 M538
2	928 612 167 06	wiring harness	/LL	-88	1
(2)	928 612 167 12	wiring harness	/LL	89	1
(2)	928 612 167 18	wiring harness	/LL	90	1
(2)	928 612 167 22	wiring harness	/LL	91	1
(2)	928 612 167 08	wiring harness	/LL	88-	1 M637
(2)	927 612 167 03	wiring harness	/RL	-88	1
(2)	927 612 167 07	wiring harness	/RL	89	1
(2)	928 612 167 18	wiring harness	/RL	90	1
(2)	928 612 167 21	wiring harness	/RL	91	1
(2)	928 612 167 04	wiring harness	/LL	-88	1 M537

Model	Year	MG	SG	Illustration	Restrictions	UPD	19:43	23.01.2010	PORSCHE	PET	PORSCHE
928	1991	9	02	902-11		248					

Pos	Part Number	Description	Remark	Qty	Model	Pos	Part Number	Description	Remark	Qty	Model
(2)	928 612 167 10	wiring harness	/LL	89	1 M537						
(2)	928 612 167 16	wiring harness	/LL	90	1 M537						
(2)	928 612 167 20	wiring harness	/LL	91	1 M537						
(2)	927 612 167 01	wiring harness	/RL	-88	1 M538						
(2)	927 612 167 05	wiring harness	/RL	89	1 M538						
(2)	928 612 167 16	wiring harness	/RL	90	1 M538						
(2)	928 612 167 19	wiring harness	/RL	91	1 M538						
3	928 555 551 02	cable guide		2							
4	999 659 002 50	water protection cap		2							
5	928 612 131 00	connector housing		2							
		mounting parts									
-	477 971 851	cable clip		4							
-	928 537 411 02	cable clamp grey		4							

Ready for the next step. On the previous page the relevant PET pages.



For better access to the wiring harness and later on the door lock mechanism remove the inner rubber window seal.

Starting on the wiring harness, first remove the connector from the door lock motor. I put a flat screwdriver between the plastic edge near the arrow and the bottom of the housing on the motor. It took a while to come loose:

