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Roof Micro Switches and Hall Sensors - Fixes and info

Locked

Dietcokeman

Roof Micro Switches and Hall Sensors - Fixes and info

Wed Mar 22, 2017 10:17 am

Gent thanks to WLH a moderator here, below is a link to my original post which I re did after PB started playing silly buggers ,and WLH kindly hosted on another web hosting site , you should get all the details including the images which are missing below from this new link . If I get any further info to post I will add it to this PDF .

http://www.eastpazscca.org/downloads/forum-5.pdf

Big thanks to WLH for helping with this .

Original posting below , but WITHOUT image , click the PDF link above to get everything I originally posted .

.....
.....

Ok , so recently my folding roof developed a common problem where the roof wouldn't operate correctly .

Just to note I have a smart top module fitted and even without that in place the roof still didn't operate correctly . I fitted it back for key operation of the roof for the videos here.

Opening -
1. Press the dash button or hold the remote button (I have a smart top module fitted)
2. Windows drop
3. Roof window folds onto of roof panel
4. Boot opens
5. Roof folds into boot.....bong ! Red roof symbol on dash and roof operation stops !
The boot should now close and the windows return to the start position . But this action doesn't happen unless you press the open button again , it should happen continuesly without the second or sometimes third press !

https://youtu.be/PWhGr8EBnAM

Closing -
1. Press the dash button to close or hold the remote lock button (I have a smart top module fitted)
2. Windows drop
3. Boot opens
4. Roof module raises out of boot up towards its shut position and then.....Bong ! Red roof symbol on the dash and roof stops about 4 inches from the windscreen top edge !
The roof should go to the windscreen top edge and lock down , the boot should close and the rear window section of the roof should then return to its closed position and the windows return to there start position . If the button is pressed a second or third time the operation is completed .

https://youtu.be/Tti3QELvJiE

I have Carly pro, and reading the codes brought up either of the following
1. A696 close control button
2 A696 Hall sensor
3. A682
4 . A691
And probably some others I can't remember !

So looking at real OEM , you get some pretty crap pictures and other various searches on google bring up other similarly rubbish info on sensor and micro switch positions for the roof.
I tried my Mr Spock head and logic to work out what was what but the trouble is much of what you need to see and get too is hidden when the roof fails to operate correctly and you end up chasing yourself into oblivion looking for the issue. Calling my local friendly BMW tech after giving him all the info I had over the phone he was only able to tell me that I stood little change of finding the problem, as he could not find A696 sensor or close button , listed on BMW's system . Ok so the

challenge was on .

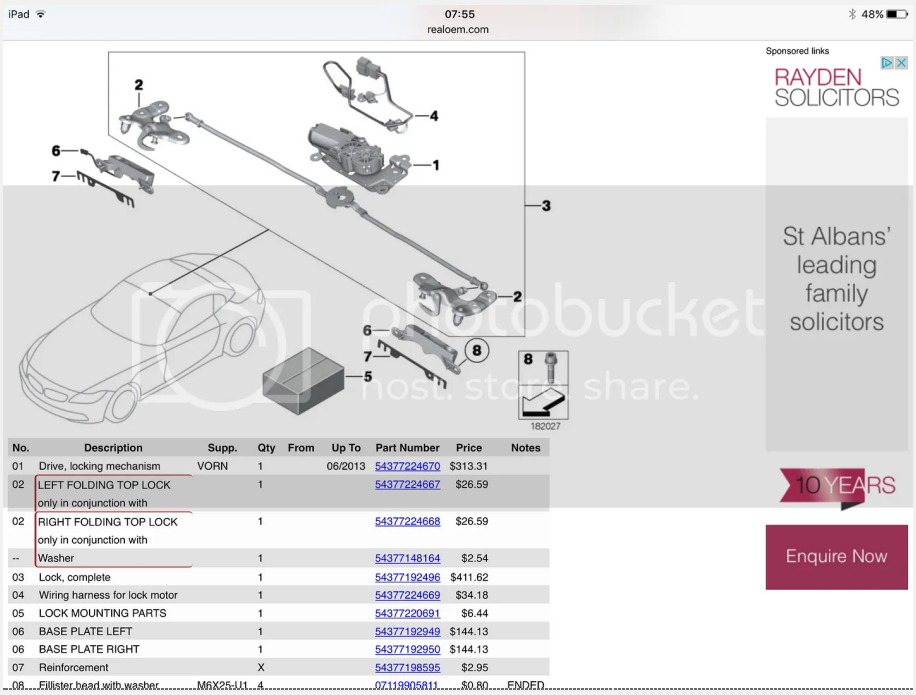
Some information on real OEM or google can help you with a starting point, but it isn't always correct (or it wasn't for me) , and many parts diagrams don't list the parts where you think they should be, they are listed in some other parts picture you wouldn't think of looking in ! All very unhelpful when your pulling your hair out trying to find what your looking for . Anyway I digress.....

So in my search I think I've found all sensors and micro switches and I will try to describe them here in this link, but BEAWARE..... there is NOT a hall sensor in the rear screen hydraulic ram passenger side like I say in the video, only in the driver side ram .

https://youtu.be/ljAJ09zEObY

Micro switches
The top roof panel has three
1. On the top of the windscreen where the lock hooks locate into the windscreen the drivers side (right hand drive car) has a micro switch on the inner edge .
2. The roof latch motor in the roof panel has 2 micro switches, they are either side of the latch cam that operates the lock hooks, this cam is in the centre of the roof panel and can only be seen with the headliner (top roof panel) off.

Items 4 has two switches in it and item 6 has one



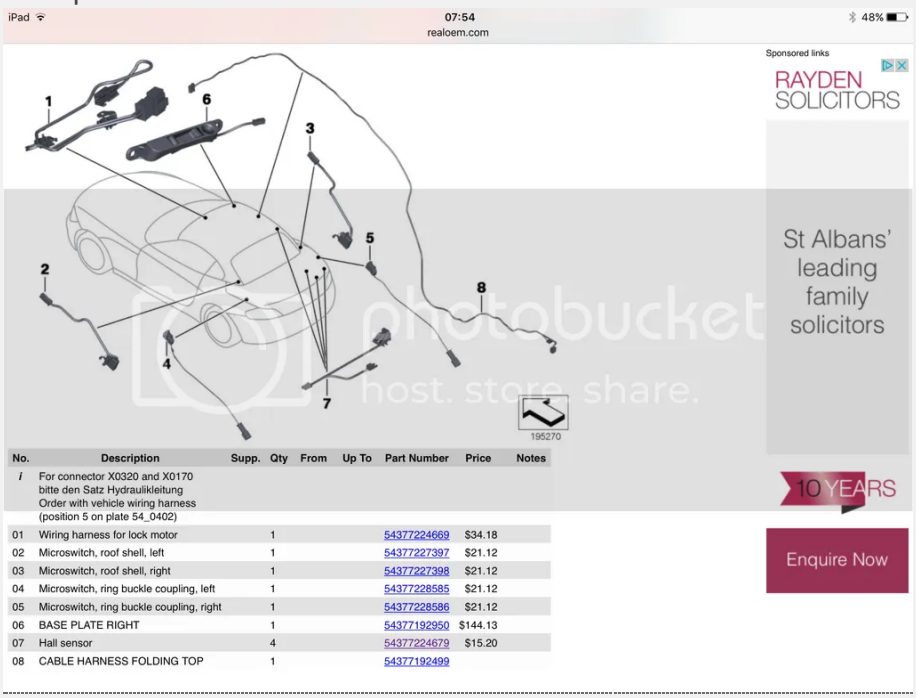
No.	Description	Supp.	Qty	From	Up To	Part Number	Price	Notes
01	Drive, locking mechanism	VORN	1		06/2013	54377224670	$313.31	
02	LEFT FOLDING TOP LOCK only in conjunction with		1			54377224667	$26.59	
02	RIGHT FOLDING TOP LOCK only in conjunction with		1			54377224668	$26.59	
--	Washer		1			54377148164	$2.54	
03	Lock, complete		1			54377192496	$411.62	
04	Wiring harness for lock motor		1			54377224669	$34.18	
05	LOCK MOUNTING PARTS		1			54377220691	$6.44	
06	BASE PLATE LEFT		1			54377192949	$144.13	
06	BASE PLATE RIGHT		1			54377192950	$144.13	
07	Reinforcement		X			54377198595	$2.95	
08	Fillister head with washer	M6X25-U1	4			07119905811	$0.80	ENDED

The Rear window roof panel
Two micro switches, these are located at the bottom edge of the side beams (to the sides of the rear window glass) and can be seen only if

you stop the roof operation whilst the rear window panel is on top of the top roof panel and look under the back edge of the rear window panel at the side beams you can see these micro switches at the bottom of the internal mechanism each side. They are hard to spot .

Items 2 and 3 are the switches and one of items 7 which is fitted in the right hand hydraulic ram of the rear window roof panel down the side of the rear screen

Parts picture



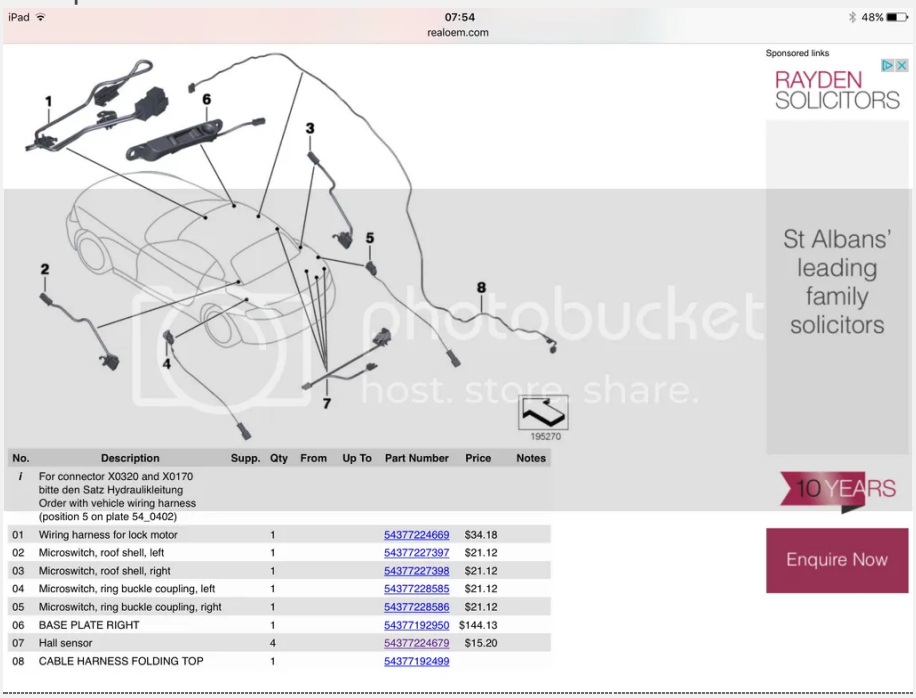
No.	Description	Supp.	Qty	From	Up To	Part Number	Price	Notes
i	For connector X0320 and X0170 bitte den Satz Hydraulikleitung Order with vehicle wiring harness (position 5 on plate 54_0402)							
01	Wiring harness for lock motor		1			54377224669	$34.18	
02	Microswitch, roof shell, left		1			54377227397	$21.12	
03	Microswitch, roof shell, right		1			54377227398	$21.12	
04	Microswitch, ring buckle coupling, left		1			54377228585	$21.12	
05	Microswitch, ring buckle coupling, right		1			54377228586	$21.12	
06	BASE PLATE RIGHT		1			54377192950	$144.13	
07	Hall sensor		4			54377224679	$15.20	
08	CABLE HARNESS FOLDING TOP		1			54377192499		

Location of micro switch and hall sensors on the car

Rear boot side hinge mechanism
2 micro switches . When the boot is raised for roof opening/closing if you stand at the fuel filler cap position,and look down the inner edge of the

boot space you will see the hinge mechanism for each side of the boot lid . Now if you look at the boot in its raise position ,you will see a big plastic hook/clam claw that locates onto a lock pin on the boot hinge mechanism (when it's closed) , just inside this lock pin (towards the body panel, behind the pin mounting) is a micro switch with a small metal spring on it . There is one each side. , it pretty hidden but careful inspection will reveal the location . One micro switch for each boot side mechanism .

Items 4 and 5 are the micro switches here,one on each side hinge left and right , and 2 x item 7 are the hall sensors fitted into the right hand side boot hinge hydraulic ram (none in the left hinge ram)
Parts picture



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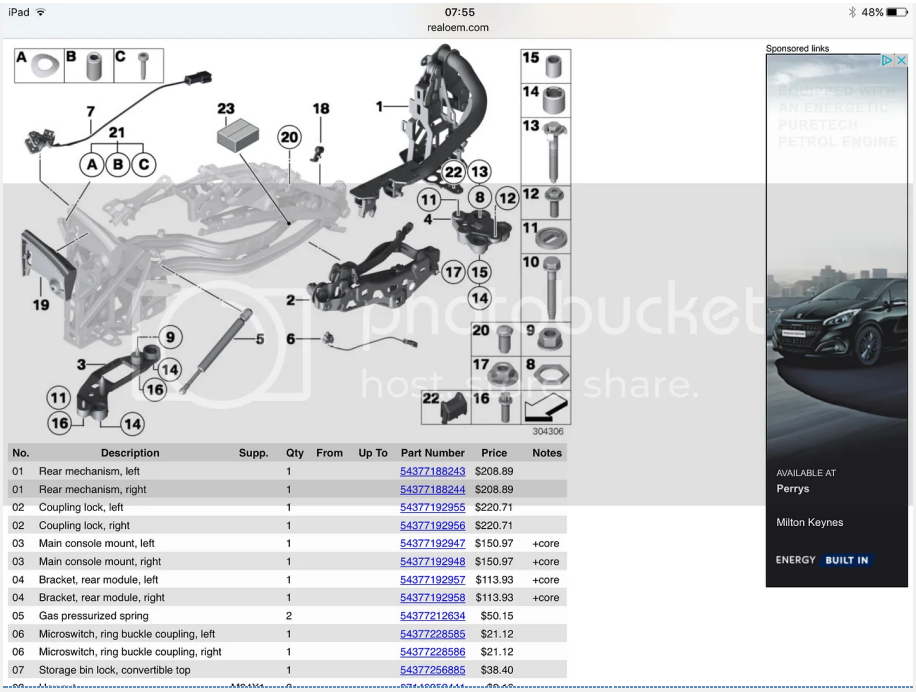
04	Microswitch, ring buckle coupling, left		1			54377228585	$21.12	
05	Microswitch, ring buckle coupling, right		1			54377228586	$21.12	
06	BASE PLATE RIGHT		1			54377192950	$144.13	
07	Hall sensor		4			54377224679	$15.20	
08	CABLE HARNESS FOLDING TOP		1			54377192499		

For locations on car see below where I remove the hinge

Roof main hinge
One micro switch. The roofs main hinge is mounted to the rear boot floor/ bulkhead . Two hinges one each side behind the seats (in the boot). The roof locks into the boot space using the same mechanism that locks it to the front windscreen. The roof lock hooks lock onto pins mounted on the main roof hinge that mirror the lock pins on the top edge of the screen. Just next to the drivers side roof lock boot pin(the bits the hooks lock onto) ,is a micro switch. It's set into a small plastic cone, the micro switch trigger is in the centre of the cone and is operated when the roof guide cone locates into it. This switch is also triggered when the boot is closed, a cone on the boot can be seen with the boot up for roof opening/ closing , that locates in the micro switch when the roof is up and not in the boot .

Item 7 is this micro switch .



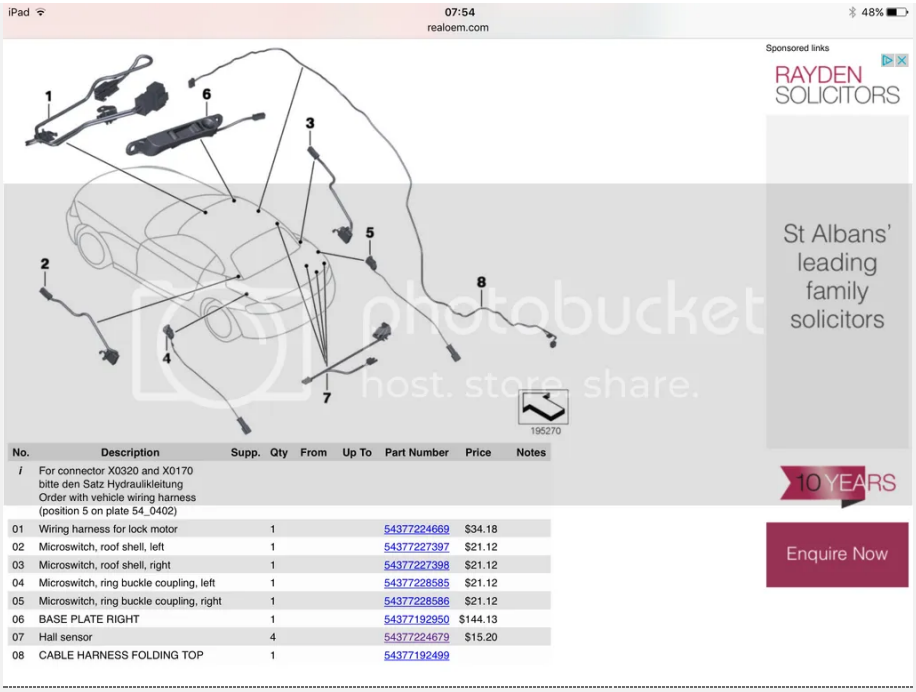
No.	Description	Supp.	Qty	From	Up To	Part Number	Price	Notes
01	Rear mechanism, left		1			54377188243	$208.89	
01	Rear mechanism, right		1			54377188244	$208.89	
02	Coupling lock, left		1			54377192955	$220.71	
02	Coupling lock, right		1			54377192956	$220.71	
03	Main console mount, left		1			54377192947	$150.97	+core
03	Main console mount, right		1			54377192948	$150.97	+core
04	Bracket, rear module, left		1			54377192957	$113.93	+core
04	Bracket, rear module, right		1			54377192958	$113.93	+core
05	Gas pressurized spring		2			54377212634	$50.15	
06	Microswitch, ring buckle coupling, left		1			54377228585	$21.12	
06	Microswitch, ring buckle coupling, right		1			54377228586	$21.12	
07	Storage bin lock, convertible top		1			54377256885	$38.40	

Hall sensors
There are 4 hall sensors
Roof partition
The roof partition locks onto two locators mounted in the floor when the partition is down for roof operation. The mounts are surrounded by a plastic trim that is removed by simply pulling it upwards . Under the passenger side is our first hall sensor . If you look at the bottom of the clamp that locates the roof partition on the floor mounts you will see the passenger side has an additional metal plate on the bottom, this is what triggers the sensor .

Roof rear window panel
The operating hydraulic rams are for the rear section of the roof rear panel are located on the inner section of the side beams (the section of rear roof panel that run down the side of the rear window glass) . The drivers side ram has a hall sensor located into the ram casing . It's about 1cm square and has two wires running to it. It's the same sort of sensor that is used on the boot hinges that I will describe next . These type of sensors just clip into the rams and are located by means of a cut out in the rams casing so once in they shouldn't move postition . Clipping them in and out isn't the problem here for replacement , it the wiring route that makes it difficult to replace .

Rear boot hinge
The rear boot hinges as describe earlier also use the same hall sensors as the Roof rear window panel. The rear boot hinge mechanism is located as described above in the micro switch location section along the rear boot side panel on the inner edge of the boot around the fuel filler position . If you look inside the boot with the boot raised for roof operation you will see the boot hinge mechanism. Only the drivers side has hall sensors, the passenger side only has a micro switch. The driver side has two hall sensors again mount into the hydraulic ram casing. They clip in and are located by means of a cut out in the ram casing, so the shouldn't move when installed. Again it's the wiring that causes replacement hassle here.

All hall sensors are listed here as item 7 , they all come now with the same length cable, your car may have long and short lead versions but BMW only sell the long lead version now.



No.	Description	Supp.	Qty	From	Up To	Part Number	Price	Notes
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05	Microswitch, ring buckle coupling, right		1			54377228586	$21.12	
06	BASE PLATE RIGHT		1			54377192950	$144.13	
07	Hall sensor		4			54377224679	$15.20	
08	CABLE HARNESS FOLDING TOP		1			54377192499		

I would also point out that, these micro switches and hall sensors are triggered by movement. In the case of hall sensors the magnetic field creates the trigger as it passes over a set point . The micro switches have a trigger switch that is operated by an arm or a button pressing on the switch. I scratched my head with a few of these micro switches, as the hinges and rams don't operate until they are in a position where you can't see them being triggered. The hydraulic rams rotate the hinges unseen to you which them moves a tab you couldn't see with the hinge in its unrotated position to trigger the micro switch.

Solving my Roof issue-

I started with the easy stuff, the roof was triggering to open close, so I knew the boot partition hall sensor was working. The roof unlocked and folded into the boot and unfolded and locked back onto the screen so I was pretty sure that the roof panel micro switches were working and the screen micro switch was working . This would also lead me to believe that the Roof rear window panel micro switches were working too . Something was not triggering the boot to close after opening and the roof not to lock onto the screen and close the boot upon closing .
First I tried the easiest micro switch to get too (well who wouldn't !) .
The Roof hinge boot micro switch .
When I went to inspect this switch I noticed that the main wiring and hydraulics for the roof run up the main hinge arms near this switch and that the mounting for the swivel arm of the boot partition is also right next to the main wiring loom and the micro switch wiring is cable tied to the main loom. The proximity of the loom, the hinge and the swivel for the boot partition is very tight. On inspection I could see my loom casing (the outer sleeving) was chaffed and I could see the inner wires.

Location ...., I'm using a rusty old Torx driver for contrast in the pictures, this is not my normal tool condition !


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host. store. share.

I dutifully cut away the damaged casing , ran a continuity test on all the wires and luckily they were all ok, but if a break in a wire is found here it's not difficult to repair. Then I repaired the casing and rerouted the wiring carefully and secured it with new cable ties. Having removed and replaced the micro switch, the roof was no different , but the switch wasn't expensive.

Location

It comes as a kit, obviously If everything looks ok your only interested in the switch.

Next I turned my attention to the boot hinge micro switches and hall sensors . The drivers side has both a switch and 2 hall sensor, the passenger side only has a micro switch . To replace either the micro switch or the hall sensor you have to unbolt the hinge. You can do this fairly easily if you do only one hinge at a time, don't unbolt both hinges at the same time, one only. First you'll need to remove the inner trim panels around the boot hinge you are doing , to get access to the hinge bolts . They are fairly easily removed , you just need a trim panel tools for the push in expansion plugs and after 2 mins you should be able to see the hinge. With the boot opened for roof operation, look at the hinge and you will see 3 x 13mm nuts holding the hinge to the body.

BEFORE you start undoing these mark around the nuts, so you can clearly see where they need to be repositioned . These hinges are adjustable and basically determine where the boot alignment goes when the boot is closed. If you don't get the nuts back in the same place on the hinges the boot may not close correctly or the panels may not align correctly . For me 2 nuts were accessible with a socket but the third, due to the ram position impeding access with a socket had to be undone and retightened with a spanner.

At this point I decided that as I could see the micro switches and hall sensor connections I would unplug one at a time and see if the roof operation acted any differently before I unbolted the hinge. With the micro switch unplugged the roof wouldn't move from where it was with the boot open, but with one of the hall sensors unplugged , the roof did exactly the same operation as it was, so I thought I'd start with that hall sensor .

[/URL]


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Having marked the nut positions , undo the 3 nuts and gentle wiggle the hinge upward and out of the boot space, you do not need to undo the hinge connection to the boot lid, but you may have to tease the hydraulic lines up from where they are mounted, I didn't but it was tight . Take care not to scratch your paintwork (I used a work mat , but a few layers of masking tape will do) . With the hinge upright you can now see the two hall sensors on the ram and the micro switch at the end of the hinge .

Micro switch

Hall sensors


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host. store. share.

How Hall sensors locate in the ram casing

I had bought both a micro switch for the right hand hinge(they are handed) and one of the hall sensors (they are both the same sensors , but from new,the car will have one with a short lead and one with a long lead , as a spare part they only sell the long lead version !) however, the connector on both the micro switch and the hall sensors have been changed from the old versions to new ones ,so you may have to chop the new connectors off the new plug and solder on your old plugs to facilitate proper connection. This is what I had to do for the Hall sensor(BMW technical services tell you this is your only option for the hall sensor connectors,(see pictures below) the micro switch connector is available with some additional parts to modify but honestly I'd chop and swap these too if I had too, it's very easy) .

Black is the new type connector, white is the old type .

Having removed the offending (so it appeared) hall sensor and checked out how the micro switch could be removed just in case I needed to do

that too (it just unscrews with two small screws)I fitted the new hall sensor (with chop and swap plug) and refitted the hinge . With every wire carefully cable tied back into position I closed the roof completely , pressed the open button and .....result it's all back to working as it should .

No re coding was required, once the faulty sensor is replaced the roof clears itself of fault codes, although they may well still be stored in the cars brain .

https://youtu.be/4qpqZHRMNoo

When I carefully inspected the old hall sensor I can see it is cracked around the outer edge so this may be something to check for. It's only a magnet but I guess any damage could cause issues.

Anyway it all works fine now . Yes I have a spare micro switch for the boot hinge (right hand side) and a roof lock down boot switch, but all three items, two switch and a hall sensor , only cost me 45 quid.

Hopefully this will help someone at some point . Need and more info, send me a message and I will try to help.

UPDATE

having done a few of these now here is another bit of info.

If your roof opens , folds into the boot successfully but the windows fail to raise and the boot won't open or the roof closes and leaves the rear window cam shell on top of the roof and the windows fail to raise. .....this is likely to be a faulty boot switch micro sensor .items 4 and 5 on the parts diagram , (microswitch ring buckle coupling)

I've done three of these now, but the sensors are handed left and right and it's just a game of luck for which one has failed. They aren't expensive at 16 quid a side so I would suggest get both sides and this should solve your issue .

Sent from my iPad

Last edited by Dietcokeman on Wed Aug 02, 2017 10:57 am, edited 3 times in total.

cerbera
Member

Wed Mar 22, 2017 12:48 pm

What a great write up. Thanks for your time and effort to share this info.

Smartbear
Lifer

Wed Mar 22, 2017 1:59 pm

Great detective work Bryan, worth printing to keep
Rob

e89 Sdrive 20i, plenty of mumbo & good economy-the thinking bears z4
e89 Sdrive 30i, this ones busted, pass me another...
e85 3.0si sold

Maniac
Lifer

Wed Mar 22, 2017 7:37 pm

Cracking bit of work, much appreciated.

I don't have any issue other than the roof settling at a bit of an angle (I think a worn ram as one side seems to start moving a smudge before the other) but if it ever plays up I will be coming back to this.

flybobbie
Lifer

Wed Mar 22, 2017 10:40 pm

Excellent write up.
Someone brave enough to tackle this problem.
So now we know what these cylinder hall sensors look like and how to get to them.
Seems like a good idea for what they cost to buy one of each type of switch/sensor just in case.
Although I feel as though there could just be a faulty batch of these out there causing problems.
Seems strange that the connectors have changed style. Perhaps a new

OEM supplier?
I would say the magnet is in the cylinder as in pneumatic cylinders.
Perhaps the cracking is allowing the Hall sensor not to be close enough to pick up the magnetic field.

Spotted this:
https://autologic.com/news/blog/friday-fault-2-fix-42

Dietcokeman

Thu Mar 23, 2017 8:32 am

> **flybobbie wrote:**
> Excellent write up.
> Someone brave enough to tackle this problem.
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> Perhaps the cracking is allowing the Hall sensor not to be close enough to pick up the magnetic field.
>
> Spotted this:
> https://autologic.com/news/blog/friday-fault-2-fix-42

Too my thinking you are probobly correct about the supplier of the hall sensors being changed, as the new style connector plugs on the hall sensors do not look any more robust than the originals . The new connectors on the boot hinge micro switches however do look better made and possibly more resistant to water ingress as they have a seal in the plug.. It apprears from looking closely at the boot hinge micro switches that it could be possible for water dripping off the boot lid when it's opened for roof operation to drip down onto the micro switch on the hinge as it's directly below the top edge of the boot and then the drips run down the micro switch wiring and into the old style plug connector . Mine looked fine but the new connector looks like it would negate that problem due to the new design with a seal,, tapping around the old plug and wiring or heat shrinking the plug and wires would also negate this,

With regard to the hall sensors, the part listing shows 4 hall sensors,. 3 are mounted in the hydraulic rams, and your correct again I believe in assuming that an internal ram components trigger the sensors as the hall sensor magnet is mounted against the ram on the underside of the

sensor so would be triggered by something in the ram as it passes the cut out internally. The original boot partition hall sensor looks slightly different to the hall sensor I bought, but I am assured by BMW that is the 4th sensor, and as it just lays in a recess in the boot floor ,nothing here to suggest it wouldn't work exactly the same ,and although slightly different in shape it does fit .

My faulty sensor is definitely cracked like your above link suggests so I suspect that is what cause the issue here.

I have ordered two spare hall sensors already and I think I'm going to order the remainder of the switches I haven't got so I have a complete set of switches too, so if anyone needs one doing I should be able to help.

If anyone need help or advice drop me a message and I will try to help out .

flybobbie
Lifer

Thu Mar 23, 2017 8:35 pm

Good site for costing out parts.
https://www.online-parts.co.uk/bmw-spare-parts/
Example;
https://www.online-parts.co.uk/bmw-spar ... nth=05#sub

metal licker
Lifer

Fri Mar 24, 2017 6:43 am

Great post **Dietcokeman**

718 4.0 GTS Boxster in YELLOW
718 Guards Red Boxster .....Gone!
A35 AMG saloon .....Gone!
JCW .....Gone !
E89 35i Msport VO .....Gone !
E89 23i SE DSB .....Gone !

Hello to Jason Isaacs

flybobbie
Lifer

Mon Apr 03, 2017 6:46 pm

Something I noticed on your fixed video, when opening the roof and it retracts into boot it judders as though it's not aligned, did you adjust this later.

Dietcokeman

Tue Apr 04, 2017 8:22 am

> **flybobbie wrote:** ↑
> Something I noticed on your fixed video, when opening the roof and it retracts into boot it judders as though it's not aligned, did you adjust this later.

Well spotted, I was waiting for someone to say something about that, but it wasn't an issue with the roof , in my hast to shoot the video I had cleared the boot of tools etc, but one of the cable ties from the packet I was using for the repairs I'd carried out had fallen out of the packet and was sitting on the roof lock mechanisum thus impeding closure, nothing to worry about I just got a mangled cable tie. It works perfectly without the rogue cable tie !

john-e89
Lifer

Tue Apr 04, 2017 5:53 pm

Brilliant post, one to keep, thanks for putting so much effort in.

M roady...OEM CSL's, strut brace, Remus back boxes, ZHP
MR2 MK 2
E89 35i project car...mapped 365bhp, M4 stoppers & wheels, KWV3's, H&R front ARB, M3 front arms, strut brace Eisenmann cat back race exhaust, VRSF downpipes inbound
E89 35is
G29

ian-r
Newbie

Sun Apr 09, 2017 10:22 am

Great post

Thanks for taking the time to put it all together, surely this needs to be a stickie?

I set about sorting my roof fault with your guide setting aside a day, I started by removing the OSR boot trim panel and bingo

It would seem someone has replaced the hall sensor on the mechanism before and used bullet connectors to join the wires for old connector. One of these had come out, i cut them out and soldered the joints and everything is perfect now.

Thanks again

ian-r
Newbie

Sun Apr 16, 2017 1:46 pm

sp3ctre,

could this be made a stickie?

Dietcokem
n

Tue May 23, 2017 7:20 am

Updated with more info

Twin Turbo
Member

Fri Jul 07, 2017 9:04 pm

Wow, great right up - many thanks

Not sure if this is too big of an task for me

Can I ask a favour and if you could re-post the images - as they are not viewable.

As I am having the same issue know

Locked

19 Posts 1 **2**

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