

Heated steering wheel retrofit by Richard Bevan (bimmerfest [riku2](#))

Document history

V 1.0 07.03.2015	Document created.
V1.1 09.03.2015	Updated with details of wiring for non vibration steering wheel switch cluster

Introduction

This document tells you how to replace your steering wheel with a heated version. This can be ordered as option 248 on a new car but can be added later **at substantially higher price** (about 4x the price of specifying option 248 in the first place). In Europe the retrofit cost is about 1000€ and this assumes you re-use things like the airbag from your original steering wheel. If you can get a dealer to do this work then labour would be additional (perhaps 1-2 hours although dealers declined to do this change for me anyway, saying it would not work).

This document is written based on 2011 and 2012 F10 5 series models for the European market. Other high end models (7 series, X5) are probably similar in how ready they are for this option (wiring, plugs etc). Low end models (1 series) might be substantially different.

Overview

You will need to get a new steering wheel with heating circuit built in, then swap over parts from your existing steering wheel (buttons, controller, airbag) and fit the steering wheel. Then add a switch to control the steering wheel heating and finally code the car to recognize the steering wheel heating. Fitting the parts alone is not enough they will not work without coding.

For my 2011 F10 the wiring to the steering column was already in place so no new wiring or fuses were needed but this was probably because my car had lane departure warning already fitted and the same 12v supply feeds the steering wheel heating and steering wheel vibration unit.

Warning

This work involves disconnecting and removing the airbag. Only do this with the battery disconnected. Do not connect the battery while the airbag is removed otherwise the car will raise a fault code and you will have to visit the dealer to clear it or clear it with Rheingold BMW software. Be careful handling the air bag, even when disconnected it might go off due to static electricity. For this reason do not place it so that it will propel itself/tools on top of it towards you.

Sources

You can find details of parts on these two sites

<http://www.realoem.com/bmw/>

<http://www.etk.cc/>

ETK is better for browsing (more pictures) and you can browse based on option code, so with the link below you can see all the parts relevant to the heated steering wheel option (S248A):

<http://www.etk.cc/bmw/EN/search/optionAppliance/52150/S248A>

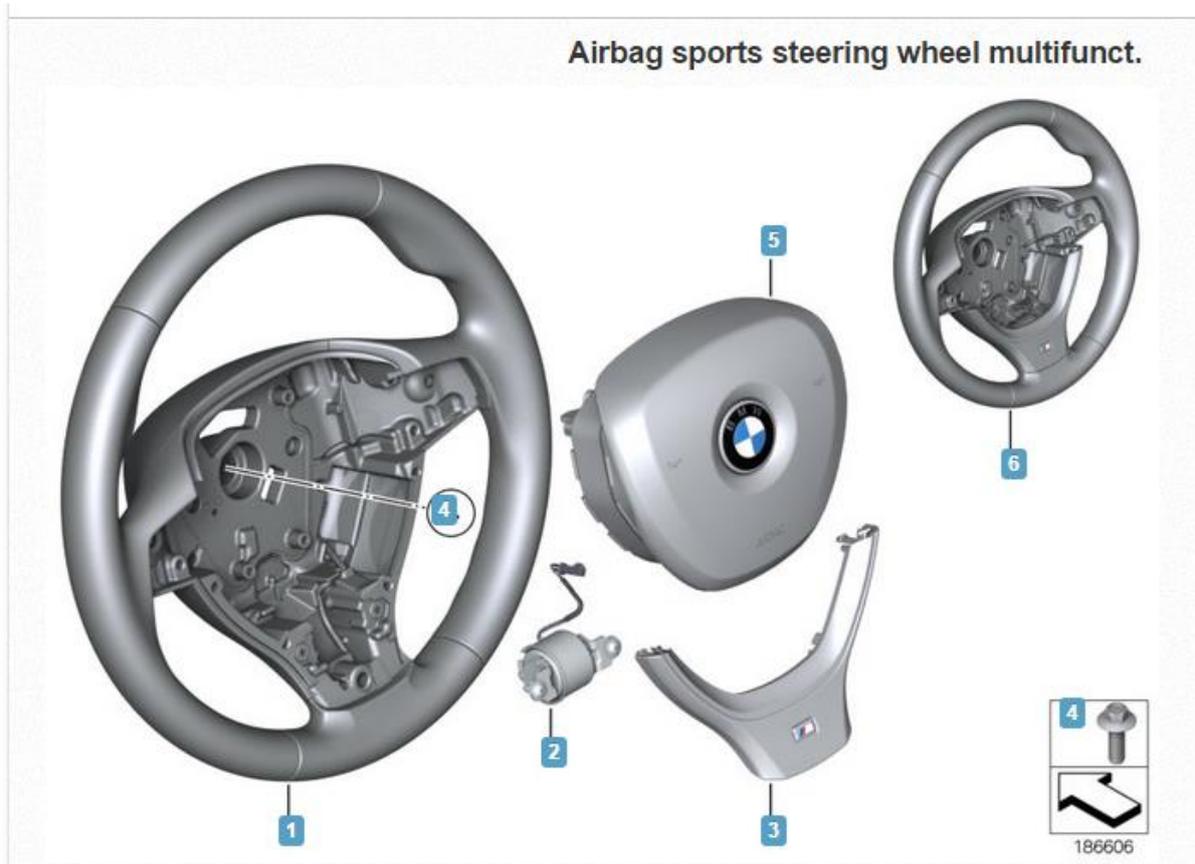
The steering wheel explained and parts needed

Summary of parts needed for heating steering wheel retrofit

Part	Approximate new cost in euros	Who needs it?
Steering wheel with heating pad	800	Everybody
Heating control switch	80	Everybody
Steering wheel control unit	200	Everybody
Steering column lower trim piece	30	Only if you have manually adjustable steering column.

Steering wheels consist of several parts, when you order a replacement steering wheel from BMW you get only the wheel (item #1 below). You do not get the airbag (#5), Y shaped trim piece (#3) or vibration actuator (2). The vibration actuator is only present if you have a car with options such as lane change warning, lane departure warning.

There are some other electronic parts making up the steering wheel and they are shown in the second picture. These are the buttons (cruise control, entertainment) and control unit (second image #2). Cars with sport automatic transmission have paddles mounted on the steering wheel (second picture #3 although only one of the two paddles shown).





If you buy a used steering wheel you might get some of the other parts included in the deal (eg buttons, Y shaped trim piece) but a new wheel from BMW will include ONLY the wheel itself although you can re-use many of the parts from the old wheel.

Choice of wheel

You will need to get a heated steering wheel (the heating pad cannot be added to an existing steering wheel). BMW make several different types of steering wheel and most have an equivalent version with heating. You can find the relevant part numbers on the part links shown above.

Eg if you have a sports steering wheel then order a sports steering wheel with heating. If you have a sports steering wheel with paddles then order a heated sports steering wheel with paddles (the paddles are not actually included but the wheel has a different design to make it compatible with paddles).

When changing to a heated steering wheel you can optionally choose a different kind of steering wheel to the one you currently have (eg change from a normal wheel to sports steering wheel) but bear in mind that the airbag is different and this will mean you cannot re-use your airbag. Since the wheel itself will cost about 800euro then replacing the airbag will add hundreds more to the already substantial cost.

Steering wheel controller

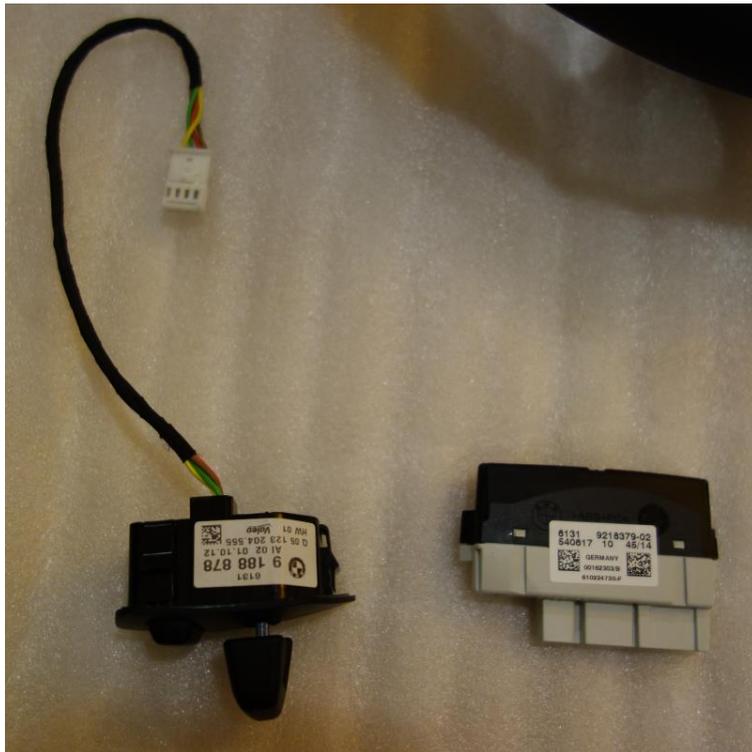
As well as a new steering wheel you will need a steering wheel controller. This small module sits in a pocket inside the steering wheel. You can see it in the photo below.

There are several different steering wheel controllers and you must choose a control module for heating only or heating + vibration. If your wheel has vibration (lane change/lane departure warning) you already have a steering wheel controller but it's not compatible with heating and you must buy

a new one (be sure to buy the heating + vibration controller, otherwise you will lose the vibration feature).

It's unclear if cars without steering wheel heating and without lane change/depature warning have a steering wheel controller at all. Some forum posts say no controller is present but the parts list shows a module for cars without any of these three options. Regardless you will have to buy a new one to add the heating function.

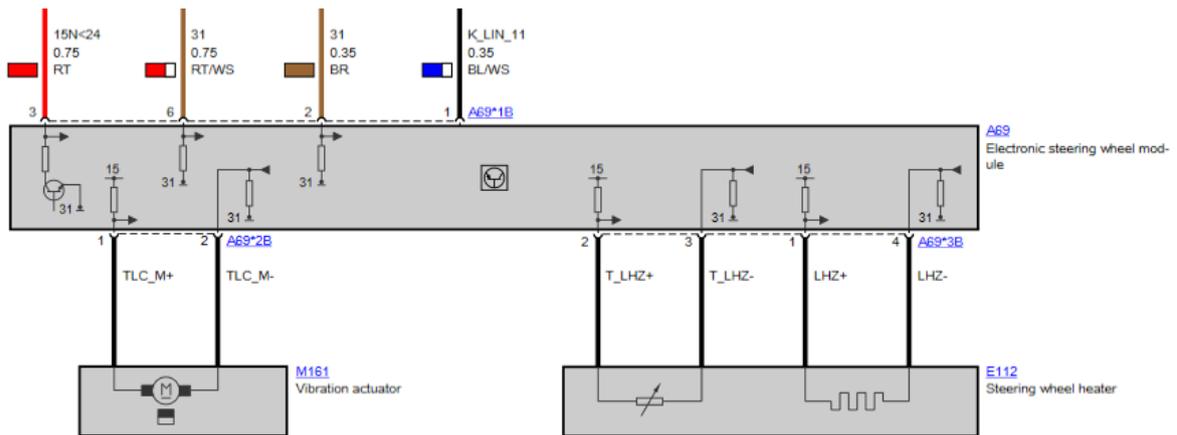
The steering wheel controller is seen below alongside the switch for steering column adjustment/heating.



Wiring inside the steering wheel

The steering wheel itself comes with its own internal wiring, so there is no separate wiring harness to buy/change. The plugs are present and connect to the relevant sockets on the steering switch cluster.

The wiring of the steering wheel controller is shown below. The controller's job is to turn the vibration on/off or heating on/off based on signals from the K LIN bus. The heater has four pins, two for heating and two for monitoring the temperature.



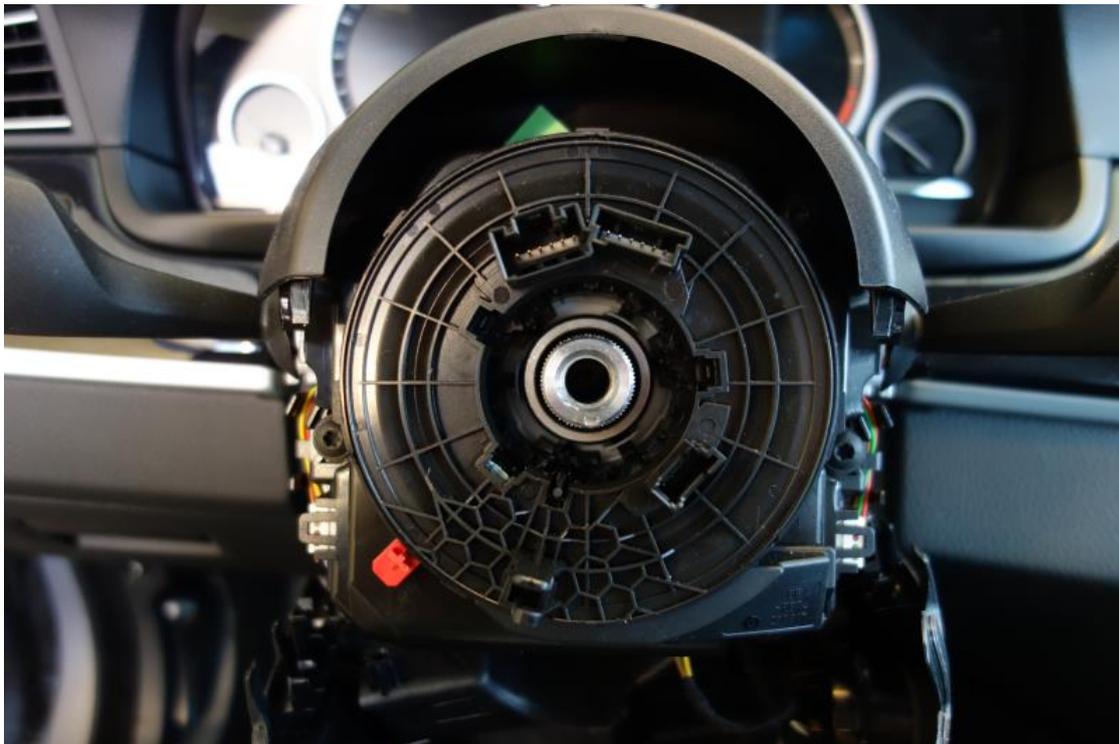
Switch cluster

There is one common switch cluster for all F10 models. It has space for three sockets which you can see in the picture below.

11 o'clock: airbag connector

1 o'clock: data connection

4 o'clock: 12v power connection for heating and/or vibration



If your car already has lane change/departure (like my car) then the 12v power connection is already wired and fuse is in place (since vibration and heating share the same 12v line).

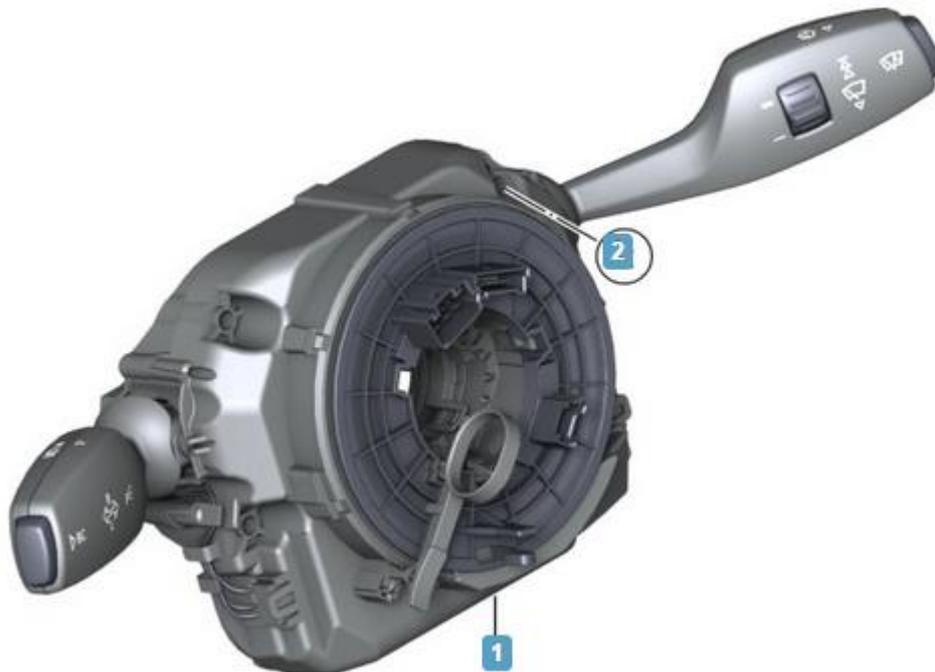
From what I've seen on internet forums, on **factory fitted switch clusters** this 12v power socket only has pins inside it for cars with heating and/or lane change/departure warning. This means that for

some cars you will have to use spare pins in the airbag connector for the 12v heating supply. Since I didn't have to do this I don't have any instructions here.

The two connections for 12v supply are red and red/white. The red/white is ground and the red is 12v supply. In the circuit diagram for the steering wheel controller you can see they are slightly thicker than the data type cables (0.75 instead of 0.35). This supply is always live at 12v, the heating button does not turn it on. The steering wheel controller sends this 12v supply to the heating and/or vibration unit as needed.

Spare part switch clusters supposedly come with this connector already wired. I suppose this saves having two parts in stock (with/without 12v power connector). A new switch cluster is about 300euro though so it's a lot of money to spend to get one connector populated.

For other models of car (not F10) the important thing to check is whether this part is different depending on whether there is/is not the steering wheel heating option, that will give you a clue as to how much effort is involved with the wiring.



Button for steering wheel heating and lower steering column trim

There are two button designs depending on whether you have manual steering column adjustment or electrically adjustable steering column (included in options comfort seats (S456A)/electrically adjustable seats (S459A). Comfort seats are called multi contour seats in North America.

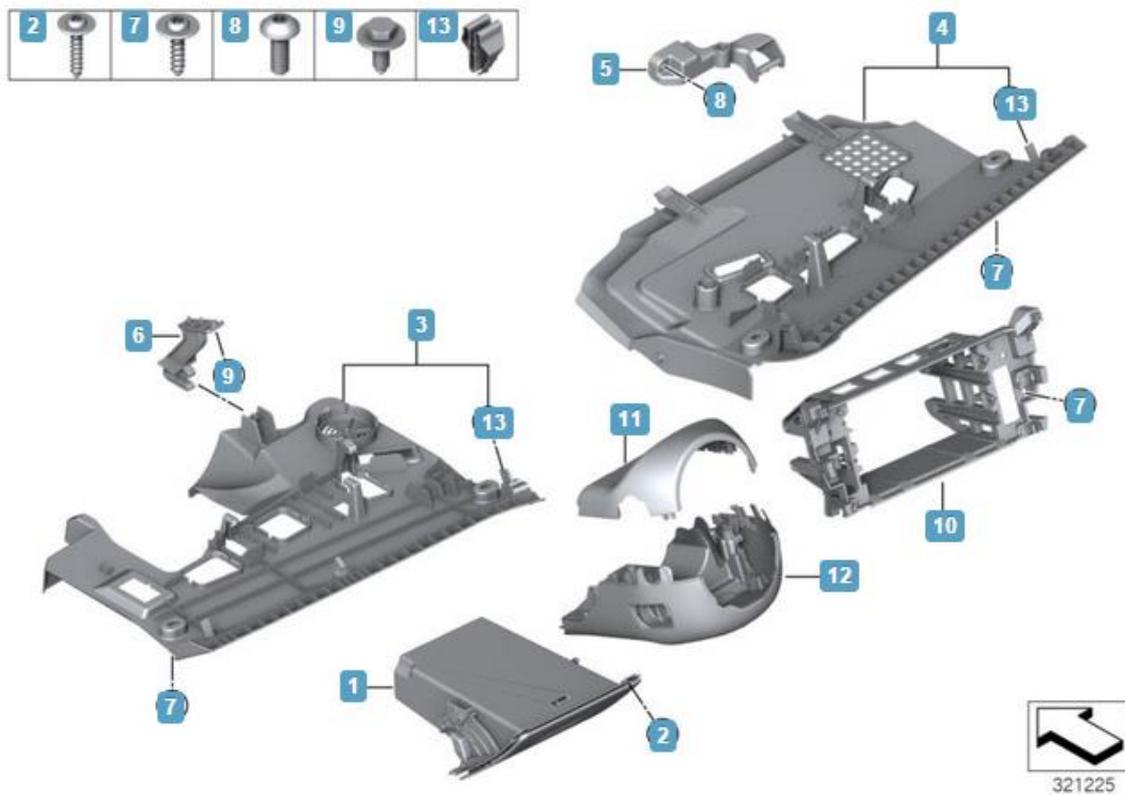
Button type	Options
1	Heated steering + electrically adjustable steering
2	Electrically adjustable steering
3	Heated steering

This switch fits into the lower steering column trim piece (#12 in second picture). Switch designs #1 and #2 are identical in size, so if upgrading a car with electrically adjustable steering column a new

trim piece is not needed. If you have manually adjustable steering column then your trim piece will not have a hole for the switch and you must buy a new lower trim piece which will have the smaller square hole for switch type 4. Make sure you buy the correct lower trim piece (for switch type #1 or #4).



Mounting parts, instrument panel, bottom



Fitting the parts

To fit the parts you must first remove the old steering wheel.

DISCONNECT THE BATTERY NEGATIVE TERMINAL FIRST. As mentioned earlier do not connect the battery with airbag missing. You will get a fault code that needs the dealer to clear it. The battery is in the boot under the floor, you need to remove the floor carpet panel first. Do not shut the boot once you disconnect the battery since the boot door has an electric switch.

Removing the steering wheel

This clip nicely shows how to remove the steering wheel. Finding the right place to push inside the wheel is a bit tricky but after a few minutes you will find it.

<https://www.youtube.com/watch?v=FgyMo1uDfCk>

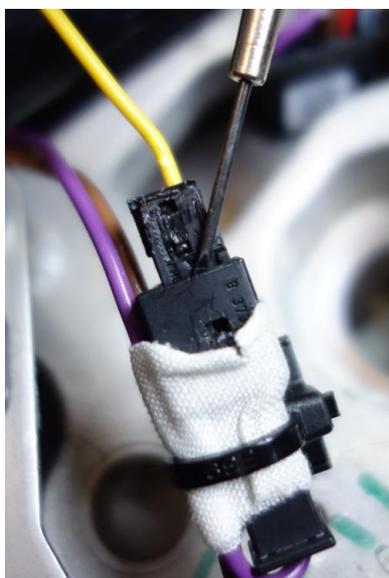
When the airbag comes free try to release it all in one go (there are four fasteners). If it half detaches then don't struggle with the release catch again, push the airbag back in and try to release it again and push the tool a bit harder. It's much harder to remove if it's half unlocked already.

The clip shows a car without steering wheel heating and vibration actuator so there is no third plug with red/white wiring shown in the youtube clip.

The nut is quite tight and you will need to use some force to remove it.

The single wire connector for the airbag is quite tricky to remove. Push a small tool into the top of the connector and lever out the plug (I struggled for a while with this plug).

Put the airbag to one side and make sure it is top side up, in this way if it fires due to static electricity it will not turn into a missile.



Changing parts on the steering wheel

Now the steering wheel is detached you need to transfer the parts from your old steering wheel to the new one. There will be controller buttons and Y trim piece. If your car has lane change/departure warning there is also a motor actuator.

The picture below shows the old parts which are transferred to the new wheel:



Left/right button panels: Undo the two screws at the back and lever out the left/right button panels. These are connected with a cable and take note of the cable routing so that you can insert it the same way in the new wheel. The cable routing is quite tight.

Once the buttons are removed, lever out the **Y shaped trim piece**.

Finally remove the **motor actuator** if your car has one.

Fit all these pieces to the new wheel in reverse order (actuator, Y trim, buttons).

Steering wheel controller

Connect the new steering wheel controller. It has three sockets for data control, steering wheel heating and vibration actuator (if your car has one).

You can see the controller in the photo below (bar code label on it). Take note of the cable routing, the cables go UNDER the airbag mounting plate. Push it into the space on the right side of the steering wheel, it's a tight fit and has claws on the side to slot into the space.

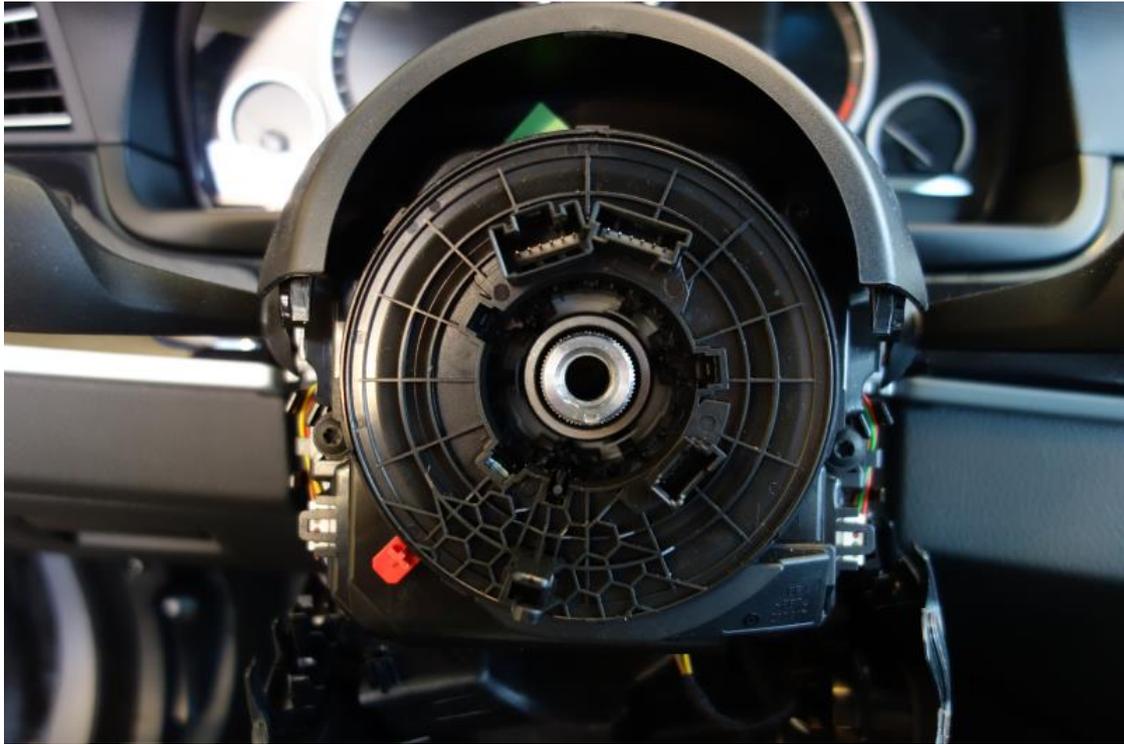


Steering column trim and heating control button

The steering column trim splits in the middle. Separate the two halves. If your car has manual steering column adjustment you must replace the bottom part.

Remove the old steering column adjuster switch (if your car had electrically adjustable steering) and then fit the new switch. The connector for this is on the right underside of the switch cluster (five o'clock position, you see the yellow/brown cable going to it in the photo). In all cases (heated steering or not) this switch connector is the same, so there is no danger the plug will not fit.

At this point if you do not have vibration actuator (lane change/departure warning) you will have to take care of the 12v supply from the fusebox to the switch cluster to feed the steering wheel heating.



Original button is shown below (electrically adjustable steering) and new button fitting into the same space.



Installing the steering wheel

Once the parts are fitted to the new wheel you can install it on the car. Clip the steering column trim pieces together and install the wheel and connect it with the three plugs.

The wheel mounting has a wide notch and it's impossible to put the wheel on incorrectly aligned so do not worry about putting the wheel on not quite straight. Tighten the screw and replace and connect the airbag.

Now the mechanical parts are done but the heated steering will not work until the coding is done.

Coding the heated steering wheel function

Installation of the parts and switch is not enough for heating to work and you must do some "coding" to update the ECU to recognize the steering wheel heating switch and enable the heating function.

How to do BMW coding is outside of the scope of this document and you can read more about it here:

<http://www.bmwcoding.com/forumdisplay.php?57-F1x>

<http://www.bimmerfest.com/forums/forumdisplay.php?f=175>

You will need the right kind of cable and some software. Then connect your laptop to the car to update the correct ECU (in this case SZL_LWS). There are various people on the internet who can do this coding if you are not comfortable doing it yourself. Coding the heated steering function is about 3 minutes work.

The kind of coding to do is called "VO" coding (vehicle order) since you will add the option 248 to the list of options on your car. After doing the VO coding, update the SZL_LWS ECU with the new coding data.

Once this is done the switch button should light up once you press it and heated steering wheel warm up.

Troubleshooting

Heating button lights but wheel does not warm up: is the fuse fitted? Is the third red/white connector wired in the steering column switch cluster? Note that even with the fuse removed the light on the button will come on but wheel does not warm up.

Button does not light up even when you press it: is the ignition on? Have you coded the car? Check the SZL_LWS setting 3000: Lenkrad_Heizing. It should be aktiv=01

Appendix: Steering wheel pictures

Below are connectors for a **heated steering wheel without vibration**. The airbag is still partly attached.

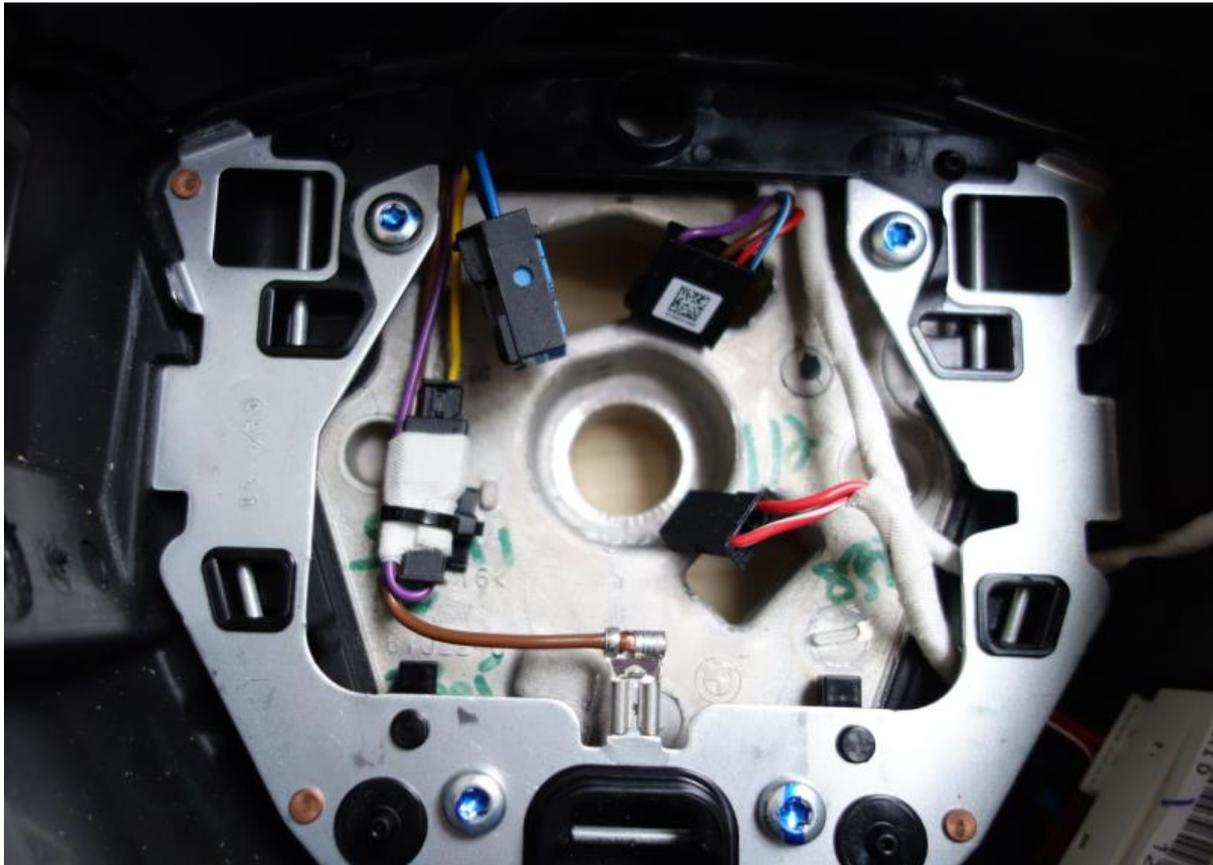
Connectors from top left clockwise:

Blue plug: airbag

Four cable: data connection

Two cable: red + red/white: supply for steering wheel heater

Purple/yellow: airbag connection.



Below: Right side of the steering wheel showing the steering wheel control unit with two plugs (this wheel does not have vibration). A control unit with heating + vibration has three plugs.



Below: connections of **steering wheel WITHOUT heating but with vibration.**

Notice how there is still the red+red/white supply to the steering control unit. The only difference between this picture and vibration+heating would be a two pin cable from the steering control unit to the heating pad inside the wheel.



Inside of a heated wheel + vibration. As you can see the connections are the same as the similar wheel above with vibration but no heating. The cable from the steering control unit to the heating pad is hidden under the trim piece on the right of the wheel.

