

Shoulder Buttons Analysis

Please note: This is based on the latest version of the 3D data I received from Benjamin. According to him, it reflects an OLDER version of the shoulder buttons area.

However, the result and solution is the same for ANY version!

Some information upfront:

According to the datasheet, the pushbuttons have a travel distance of 0,3mm (+0,1 / -0,2mm).

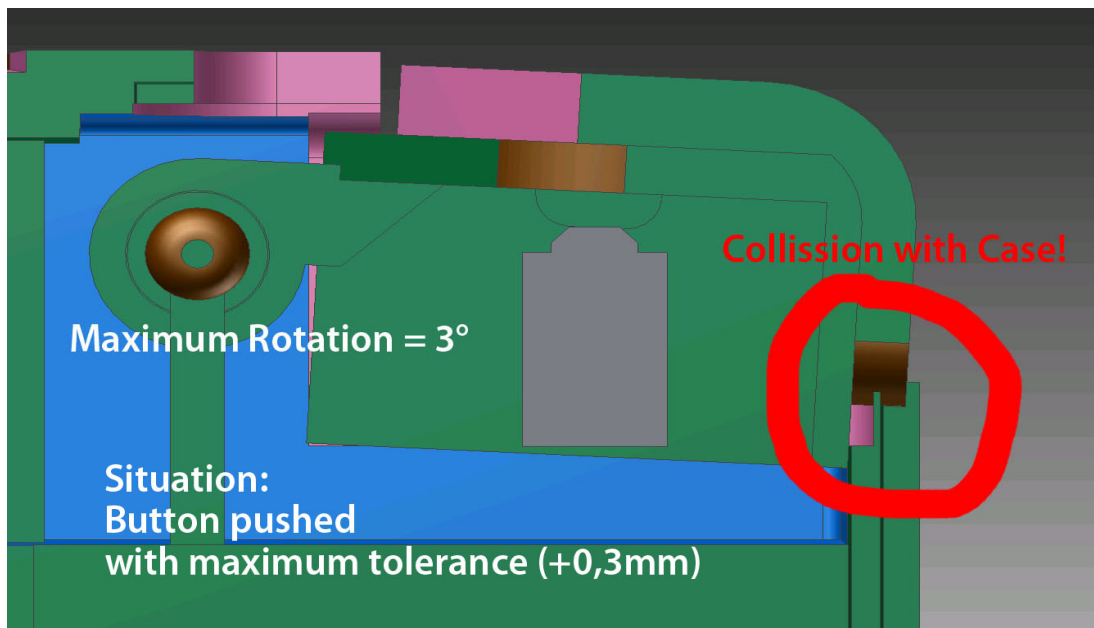
They ALWAYS need to be pushed all the way down!
This applies to BOTH shoulder buttons.

So the shoulder button needs to be able to allow a travel distance of AT LEAST 0,4mm. As the placement of the button probably also has +/- 0,1mm, it should AT LEAST be 0,5mm – better 0,6mm.

So what I did was looking at the minimum and maximum values to see if that works well with the current shoulder buttons or whether they do collide with something.

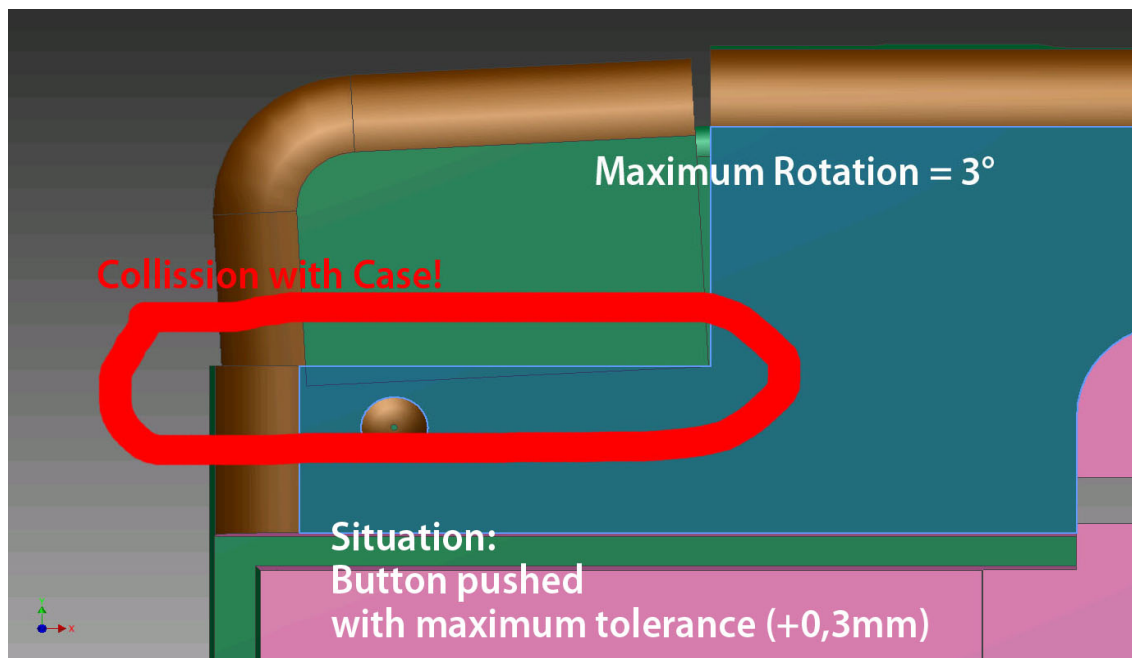
So, based on the tolerances, the shoulderbutton needs to be able to reach -0,2mm (outwards of the case) until +0,6mm (towards the case).

1. Situation: Lower shoulder button, fully pushed



Assuming that the button has a travel distance of 0,4mm (maximum tolerance) and the placing of the button also has a 0,2mm tolerance, the MAXIMUM total travel distance is 0,6mm.

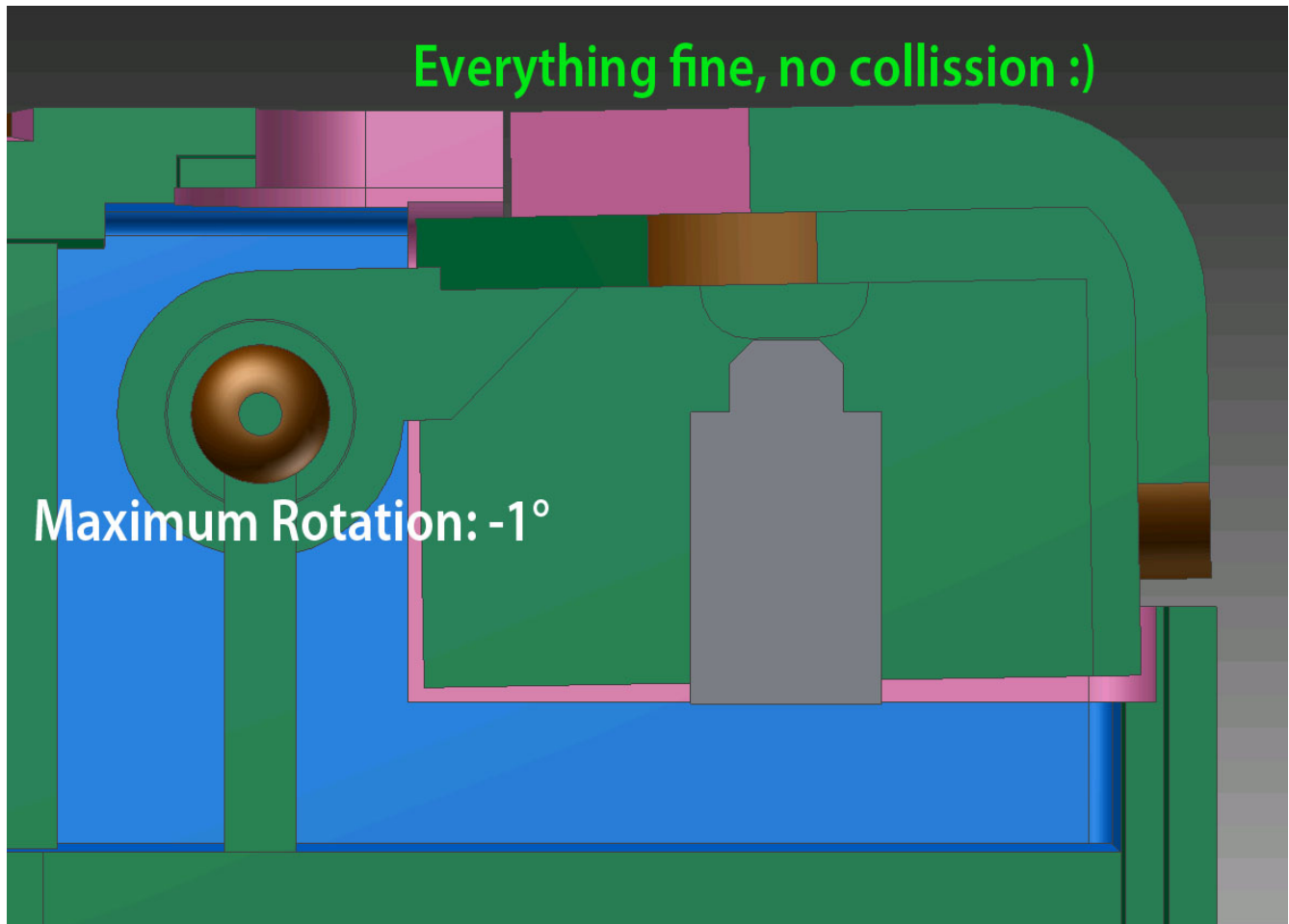
This means that the button needs to be able to rotate by 3° towards the case. With the 3D data I received, it clearly does that. Not only on the sides as seen here, but also on the bottom, as can be seen on this picture:



2. Situation: Lower shoulder button, not pushed

As mentioned above, with a 0,2mm tolerance, the shoulder button also needs to be able to move a bit away from the case (-0,2mm).

The MAXIMUM situation has been simulated here:



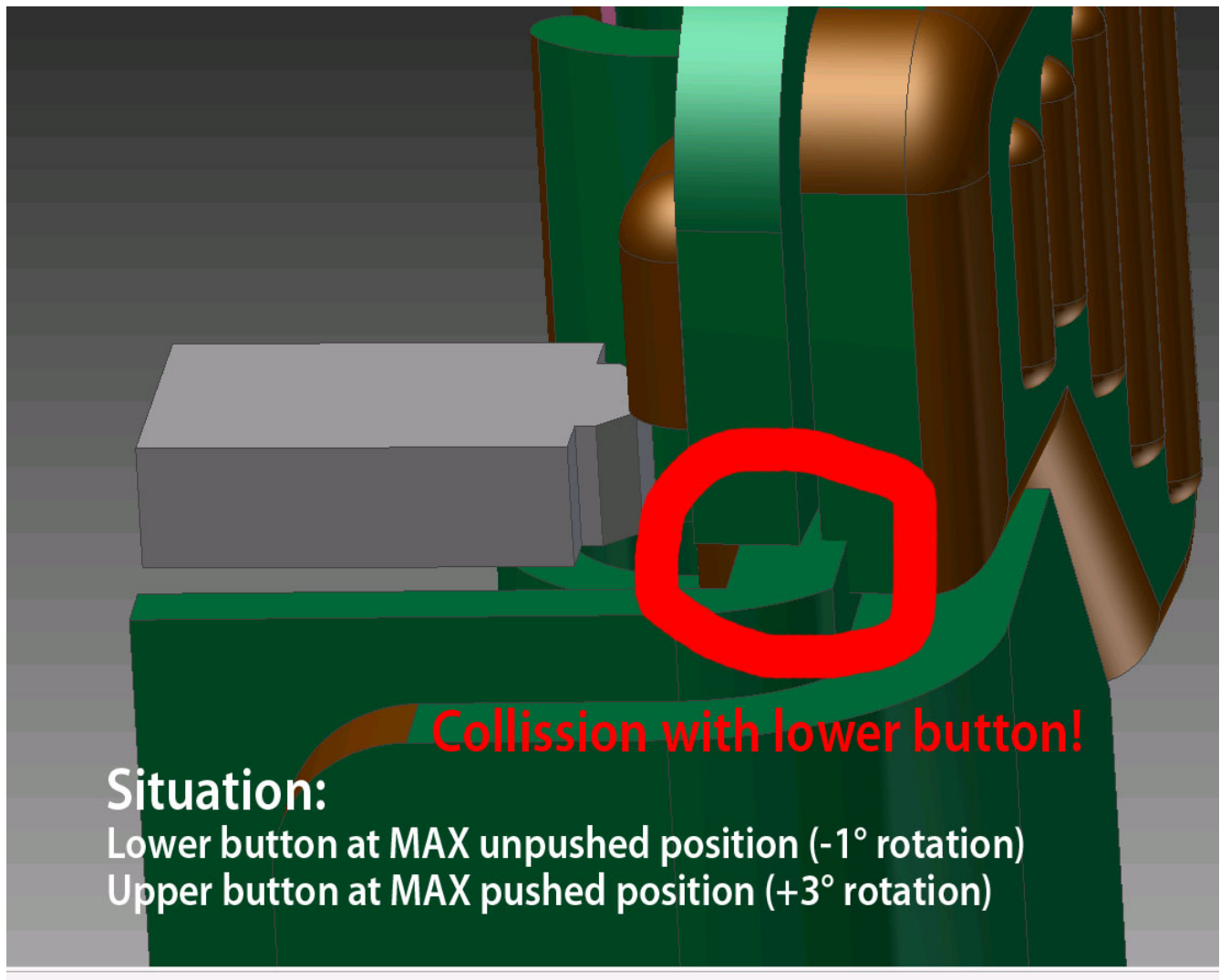
The rotation to move 0,2mm away is -1°. As you can see, there is absolutely no problem in this direction. The button doesn't collide anywhere. Great :)

3. Situation: Lower shoulder button not pushed, upper shoulder button pushed

As before, I also simulated the MAXIMUM situation here.

That means: The pushbutton of the LOWER shoulder button is sitting at -0,2mm (or: -1° rotation).

The pushbutton of the UPPER shoulder button has the opposite maximum tolerance, so the shoulder button needs to reach +0,6mm (or: $+3^\circ$ rotation).



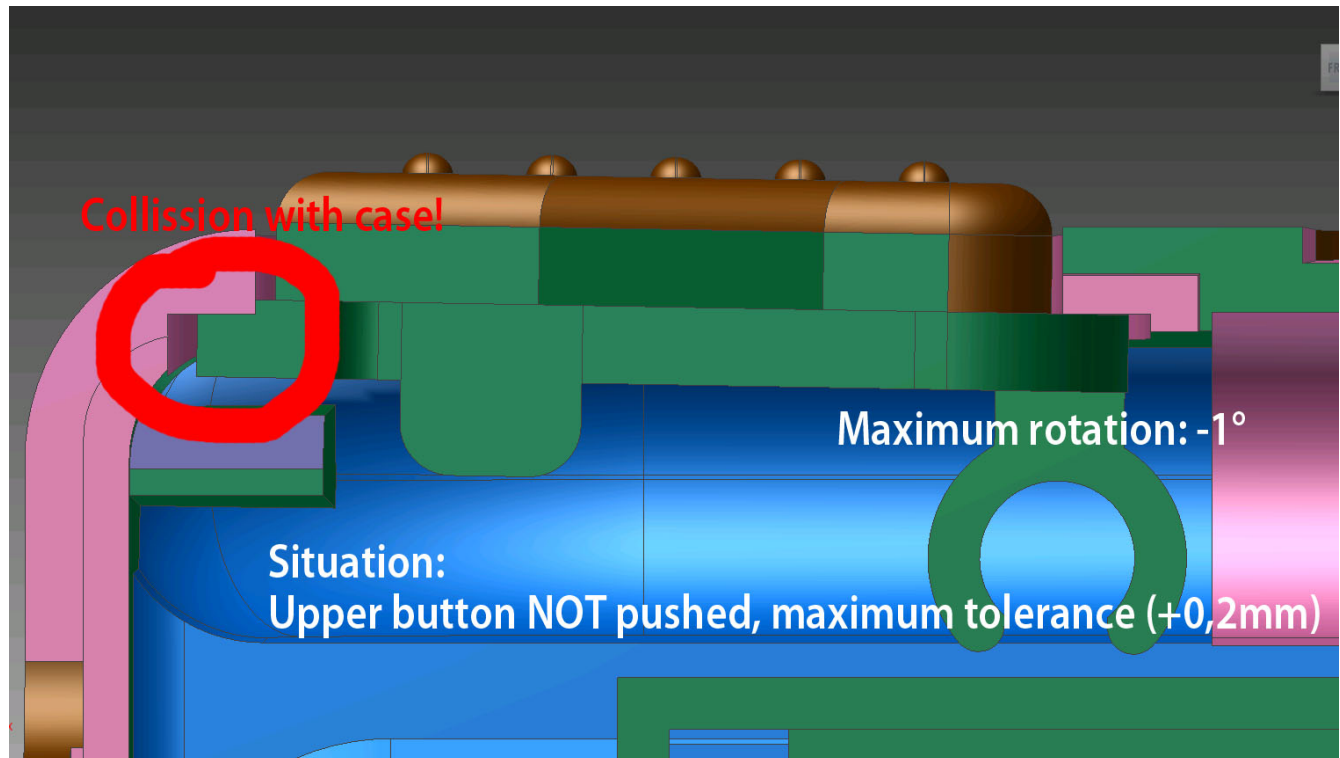
While the shoulder button doesn't collide with the case, it does collide with the lower shoulder button!

This prevents being able to use the upper shoulder button when the lower button is not pressed!

4. Situation: Upper shoulder button not pushed

Lastly, the upper shoulder button also needs to be able to move -0,2mm outwards (or -1° rotation).

This doesn't cause an issue with the other shoulder button, but again with the case:



5. Summary and conclusion

With all tolerances taken into account, both shoulderbuttons need to be able to rotate between -1° (away from the case) and +3° (towards the case) in any situation, independently from each other.

This is VERY easy to simulate and test with 3D data!