



Generic lockable ball joint



HD_Creator

[VIEW IN BROWSER](#)

updated 2. 9. 2024 | published 2. 9. 2024

Summary

For a mobile phone fixture in my car, I needed a slim ball joint that can be locked strongly by hand. Here it is!

[Gadgets](#) > [Other Gadgets](#)

Tags: [ball](#) [universal](#) [balljoint](#) [universalballjoint](#)

Use case:

Once I had completed the slim 12mm lockable ball joint, I realized how super useful this kind of design is. While the lock is quite strong on the 12mm ball already, I figured there are probably use cases that require an even stronger ball lock. So I experimented and created a second “eco system” at 150% of this, featuring a 18mm ball.

To some degree you can simply scale the 12mm parts to make them fit to the 18mm parts. But the metrical threads that are part of this, needed extra design work to keep them ISO conform.

I have several ideas for applications of this ball joint, which I intend to publish soon.

Fell free to use this part for whatever application or re-mix it into any of your designs.

Details on the 12mm eco system:

The thread on the rod is a metrical M10 thread that is optimized for 3D printing. With a good printer (like the Prusa i3 MK3S) it should be fully compatible to a standard M10 nut. (My Mini did a slightly less perfect job, for printing on the Mini I recommend to scale the rod to 98% in X and Y direction.)

Accessories and derived applications:

One part of this system that you may find helpful is this M10 thumb nut:

<https://www.printables.com/model/371499-thumb-nut-m10-printable>

For those of you are still not satisfied with the locking force provided by this design, I have recently designed an upgraded union nut with 4 strong grips. It is made for the 12mm eco system, but can be scaled to 150% to fully fit the 18mm parts. <https://www.printables.com/model/379436-union-nut-with-4-grips-for-generic-ball-joint>

A miniature action camera tripod as practical application of this ball joint can be found here

<https://www.printables.com/model/383857-mini-tripod-for-lockable-ball-joint-eco-system>

Another derived application for this ball joint is a GoPro mount with M10 inner thread on its bottom side, so it can fit to the M10 rod of this ball joint. For the best possible stability, I recommend to use the special ball-with-M10-rod that can be found together with the GoPro mount here:

<https://www.printables.com/model/383924-gopro-mount-for-lean-lockable-ball-joint>

Credit for the idea:

Thanks a lot for the idea on this working principle to **Chris (Aero)Engineering Design**. He demonstrated the idea in this post:

<https://www.printables.com/model/368218-lockable-ball-joint>

I tested the functional principle with my own design, against another working principle that I had favored before I saw the post from Chris. It turned out that his principle was superior to mine, so I continued on this path. My requirements were even tougher than what the design from Chris would meet, so I did my design from scratch but based on his inspiration. This is the result. Mainly the ball is smaller and the thread on the union nut and the ball joint has a 90° flank angle, which is easier to print so I could make it smaller as well. To increase the torque that can be put on the union nut by hand, I have added the grips all around. Thanks to that, the ball with the threaded rod can be locked really well.

Printing

Printing this parts is fairly simple. Just print them in the uploaded orientation. No supports are needed. For the threaded rod I recommend a brim, but with good bed adhesion that might not even be needed. I recommend at least 3, better 4 perimeters, to make the parts strong. I believe 25% of infill is good enough if you do that.

The ball joint and the union nut should fit together very well, that was at least the case on my Prusa i3 MK3S. On the Mini it was not so perfect and needed quite a bit of force to get the nut on the thread. If that should be a problem on your end as well, print the union nut at 103% scale in X and Y direction. The same it true for the M10 thread, rather go for 98% scale in X and Y direction if your Mini gives you a hard time.

Please like it if you like it

Your satisfaction is my reward, please give me a like if you like this design. Even better: A picture of your print totally makes my day, especially if it is part of a creative remix.

Happy printing!

Model files



Ball joint with 12mm ball (small, moderately strong)

3 files



ball_socket_v017.stl



union_nut_v017.stl



ball_with_threaded_rod_m10_v017.stl



Ball joint with 18mm ball (medium size, even stronger)

4 files



ball_socket_v024_18mm.stl



union_nut_v028_18mm.stl



ball-18mm-with-inner-m10-thread.stl



m10-thread-with-11mm-diameter-unthreaded-rod.stl



Step files exported from FreeCAD experimental

4 files

ball-socket-for-18mm-ball-_v036.step

gopro-shaft-with-m10-thread-_v036.step

lock-nut-for-18mm-ball-_v036.step

ball-18mm-with-m10-thread-_v036.step



Experimental 90deg angled rod

3 files



ball-without-thread.stl



ball-with-90deg-thread.stl



thread-with-bend.stl

License

This work is licensed under a
[Creative Commons \(4.0 International License\)](https://creativecommons.org/licenses/by/4.0/)



Attribution

- ✗ | Sharing without ATTRIBUTION
- ✓ | Remix Culture allowed
- ✓ | Commercial Use
- ✓ | Free Cultural Works
- ✓ | Meets Open Definition