



Assembly instructions for original FCM-NC-Variant2-Coilover and newer FCM Elite 31XX single and 32XX double adjustables

Contents



Figure 1a. Unassembled NC (2006+) MX5 Miata FCM Variant 2 coilovers. MCU bushing (in yellow) shown on upper portion of front shocks – not provided in all cases





Figure 1b. Assembled NC (2006+) MX5 Miata FCM Variant 2 coilovers.



Figure 2a. Front FCM Variant 2

Figure 2b. Front FCM Variant 2

Figure 2c. Rear NC Variant 2

General comments about maintenance/repair work:

It has been our experience (beautifully described by Robert Pirsig, who wrote ‘Zen and the Art of Motorcycle Maintenance’) that when working on any machine or mechanical device, it is best to begin when rested, with sufficient time, light, and energy to complete the job. When in doubt, get help and ask questions. When working on suspensions this is particularly important as it is literally your connection to the road. If you find yourself stressed, tired, hungry, or frustrated please do yourself and us a favor by taking a break or giving us a call to ask a question. Your Miata provides you and your passengers with enjoyment and safety – both deserve the best you can give it during this important work. Two brief, pointed thoughts to ponder (we didn’t coin them, they just fit):

‘Don’t make an important decision on an empty stomach.’

‘Never answer a letter when you’re angry.’

Tools/references:

Standard metric socket/ratchet sets, low-profile floor jack (in some cases), (4) jack stands, 100 lb-in torque wrench, **M8 Allen key to securely hold the Variant 2 shaft from rotating while bushings are tightened, 19mm ratcheting box-end wrench (Gearwrench or similar).**

Bump stop orientation

1. In general, all bump stops are placed with the narrower end facing the shock body as shown in **Figure 3**.
2. Place bump stop on shaft (36mm shown) followed by the Bilstein spacer, then a red anodized washer.



Figure 3.



Figure 4.

Front coilover assembly

3. Thread the spring perch (raised lip toward the sleeve) onto the coilover sleeve, then place the sleeve over the front shock (the inner tapered section of the sleeve goes over the shock first).



Figure 5.



Figure 6. This end goes over the shock first

4. Insert the O-ring between the top of the sleeve and the shock body using a dull knife or other instrument that will not scratch the shock or yourself. The O-ring will not be visible once it has been properly inserted.
5. Place the FCM-supplied M12 inside diameter aluminum bushing adapter over the red anodized washer, then add the OE Mazda lower rubber bushing.



Figure 7. The FCM aluminum bushing sleeve replaced the OE zinc-plated bushing sleeve

6. Place a blue helper spring onto the front shock assembly, followed by the 2.5" spring and the FCM front upper spring adapter.



Figure 8.

7. Add the OE front shock mount.



Figure 9.



Figure 10.

8. Above the OE front shock mount, add the OE top bushing and an FCM-supplied red anodized washer.

Proper tightening of the M12 nut – Critical Step!

9. By hand, thread an FCM-supplied M12 x 1.25 nut over the shock shaft threads. **Once there is resistance**, insert an M8 Allen Key (**it MUST be an M8 and MUST be used with the flat end of the Allen**)



Figure 11.

10. Press securely along the axis of the Allen key into the shock shaft and tightened the M12 nut until you experience strong resistance (the distance from the top of the shaft to the top of the nut will be approximately **16-18mm**. **This may vary from car to car so please check before over-tightening and causing damage. When there is significant resistance (more than 25 lb-ft) the bushings have been properly loaded.**



Figure 12.

11. Once the bushings are loaded, add the M12 jam nut and secure hand-tight, again keep any pressure into the shaft from the M8 Allen key along the axis.



12. Adjust the front spring perch position up to approximately 1" above the bottom of the sleeve. This is a good nominal starting ride height. We recommend most NC use 12.5 – 13" front ride height (fender lip to hub center) and ¼" higher for the rear. The lower values are for smoother roads or those willing to take a firmer ride due to more bump stop engagement.



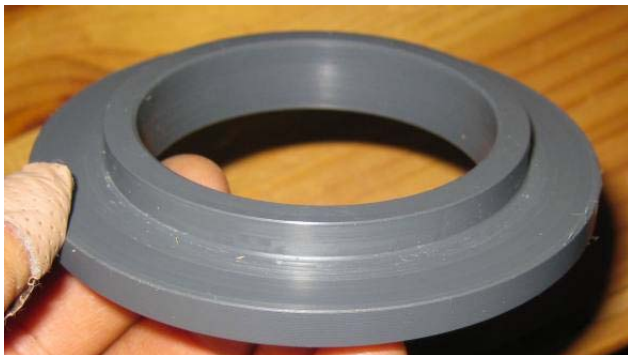
Figure 13.



Figure 14. Complete NC front Variant 2 assembly

Rear coilover assembly

13. Same initial steps as on front shock assembly, however there is an adapter between the rear helper spring and the rear tapered (70-90mm inside diameter) main spring.



**Figure 15. Rear spring adapter, top shown
For 70mm ID main spring**



**Figure 16. Bottom surface counterbored for 2.5" ID
helper spring**

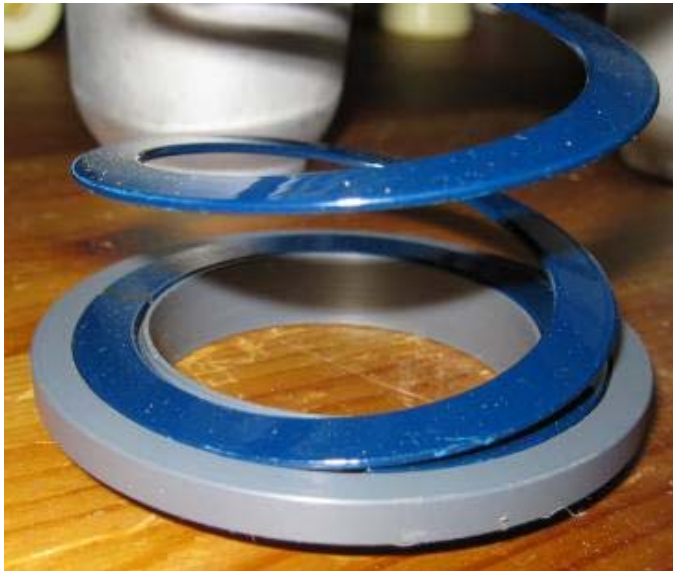


Figure 17. Helper installed



Figure 18. Stacked rear springs and adapter

14. The rear upper spring adapter is also shown – it indexed against one of the studs in the OE shock mount (**Figures 19 and 20**).



Figure 19. Rear upper spring adapter (note notch) placed on 70-90mm main spring



Figure 20. Notch in rear spring adapter to index against OE stud.

15. Add the upper OE bushing and red anodized washer, then thread the larger M12 nut on by hand until there is resistance.



Figure 21.

16. As with the front, place the short, non-ball end of an M8 Allen key into the punched hex of the shock shaft. Press down securely along the axis of the Allen key into the shock shaft and tighten the M12 nut until you experience strong resistance (the distance from the top of the shaft to the top of the nut will be approximately **16-18mm** when the bushings are properly loaded). **This distance may vary from car to car so please check the gap and use good judgment before over-tightening and causing damage. When there is significant resistance (more than 25 lb-ft) the bushings have been properly loaded.**



Figure 22. Measure this distance for proper bushing load (16-18mm)

When in doubt, please call us before proceeding!

17. Once the bushings are loaded, add the M12 jam nut and secure hand-tight, again keep any pressure into the shaft from the M8 Allen key along the axis.
18. Set the lower spring perch to approximately 0.5" above the coilover sleeve. This will provide a nominal starting ride height near 12.75" in the rear.



Figure 23. Rear lower spring perch nominal position



Figure 24. Complete NC rear Variant 2 assembly

Coilover installation

19. Install the front and rear coilover assemblies to the vehicle per factory service manual. Settle the suspension with a 10 minute test drive then verify ride heights are within expected range (12.5-13.0" front, rear = 0.25" higher than front). Adjust the spring perches as needed (suspension must be unloaded to change perch positions).
20. Contact us for alignment specifications particular to your vehicle, tire choice, usage, etc. We highly recommend corner-balancing any vehicle equipped with adjustable height suspension. This equalizes weight transfer in both left and right-handed turns, maximizing grip, performance, and enjoyment.

Damping adjustments

21. The FCM Variant 2 adjustable monotube shocks are supplied pre-set at the factory. If firmer damping is desired, use a 5/32" (supplied) or M5 Allen key and turn the internal set screw clockwise, just as you would to tighten a screw or bolt. For softer damping, adjust counter clockwise. When in doubt, always index back to FULL STIFF then count number of turns softer from stiff. There are approximately 7 useful turns of adjustment. Up to about 1.5 turn, the adjustment is quite linear. From 0-1.5 turn, the adjuster goes into a more exponential range. It's highly unlikely any user would find more than 1 turn useful for damping as the amount of low-speed bleed force becomes so great most tires would simply skitter across the surface.

These are the ranges we use for various types of driving:

Grand Touring/Maximum comfort : 4-6 turns from full stiff

Street and Backroads: 3-5 turns

Track / Enthusiastic driving : 2-4 turns

Autocross / Drift : 1-3 turns

Enjoy your FCM-improved suspension!