

# Flyin' Miata

## Adjustable timing wheel instructions 07-91001

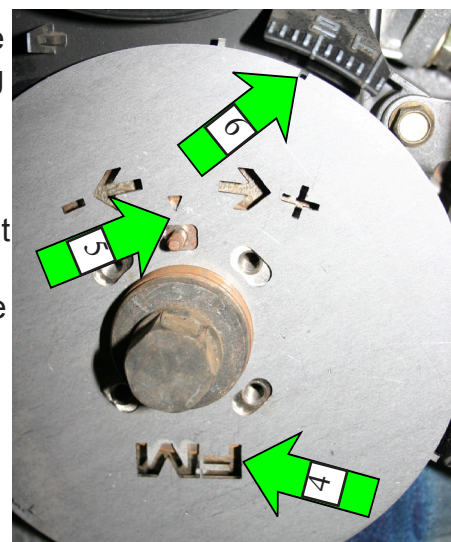
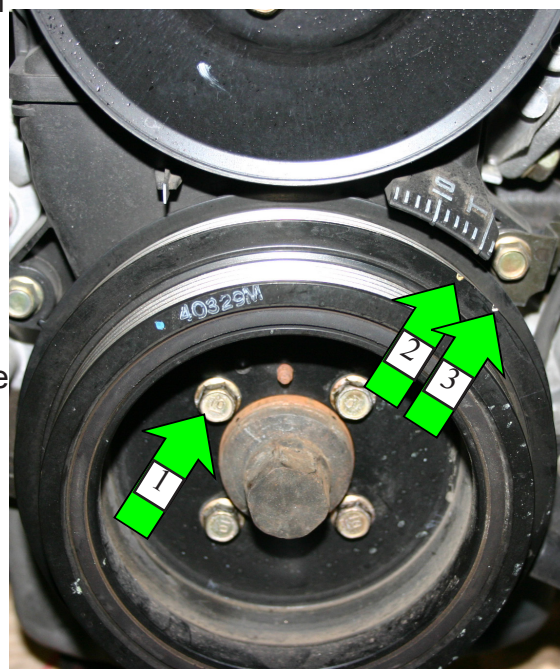
Congratulations on purchasing our adjustable timing wheel! This will allow you to retard the timing for safe operation under boost, as well as advance the timing for more power with naturally aspirated engines. The installation of this piece is pretty straightforward, but it's very important that it's installed and adjusted properly. Improper installation can range from an inoperative engine to severe engine damage. As long as you carefully follow these instructions, you'll be fine.

1) First, remove your accessory belts. The AC and power steering belt must come off first, then the alternator belt.

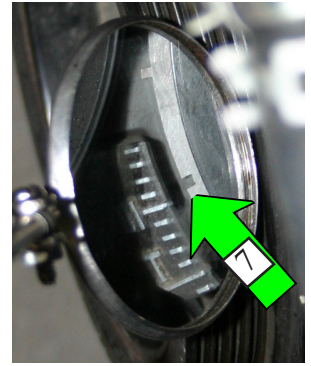
2) Break the four 10mm bolts (1) loose, then use a 21mm socket on the center bolt to rotate the assembly clockwise until the timing mark on the crank pulley lines up with the T on the scale (2). There are two marks on the crank pulley - the yellow (intake-side) mark should be lined up with the T and the white (exhaust-side) mark should be off the scale, as shown (3). Once it's properly oriented remove the four 10mm head-bolts. Do NOT remove the 21mm bolt.

3) Remove the crank pulley and the stock timing wheel and replace it with your new adjustable timing wheel. It's very important that the "FM" on the wheel is legible from the front as shown (4). The wheel will be a tight fit, but it's supposed to be.

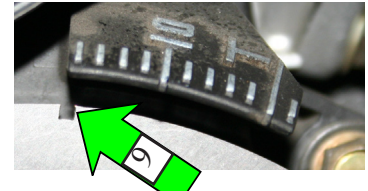
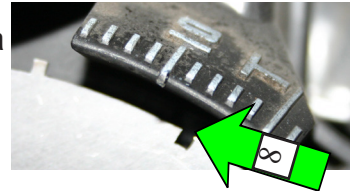
4) The triangle (5) indicates where the pin should be for 0° of advance or retard. This is the stock setting, so in this orientation the new timing wheel is functionally a duplicate of the stock timing wheel. With the pin lined up with the triangle, the notch in the outside of the wheel (6) should be lined up with 10 on the scale. The sharp people will realize that this means that the notch is lined up with 10 when the engine is at 0° / TDC (top dead center). While this seems counter-intuitive, there is logic - this allows you to use the scale to set your initial timing. If the notch were lined up with T, you could use the scale to adjust the timing in one direction but not the other. There's another part that seems like a logical fallacy but isn't - you advance the timing by rotating the wheel towards the T, and you retard it by rotating it in the other direction. Since the engine rotates in a clockwise direction, rotating the wheel towards the T will cause the teeth on the trigger wheel to pass by the sensor sooner than they normally would, hence advancing the timing. The opposite is true for retarding the timing. As long as you follow the arrows, you'll be good. The arrows will be hidden once everything's installed, but you'll still be able to reference these pictures.



4b) But wait! Your engine is in your car, so you can't see the notch! True, it's tough to see, but by using a mirror (7), you'll be able to see the notch while not being able to look at it straight-on. Beware of parallax; the notch in the picture is lined up with 10, even though it doesn't look like it. As long as you remember where you were before, you should be able to get it right.

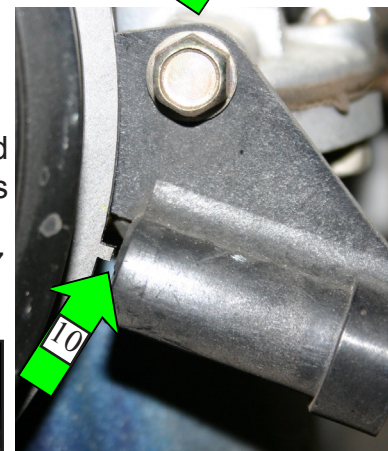


5) For forced induction (including our Stage 1 kits), start with your timing retarded by 6°. In other words, line your notch up with the 16° mark (there are marks every two degrees), per step 4 (remember the arrows!). If your car is naturally aspirated, you'll spin it in the other direction. Be aware that the more advanced your timing is, the greater your likelihood of knock is, so start conservative. This timing wheel offers a max of 4° of advance (8) and 8° of retard (9).

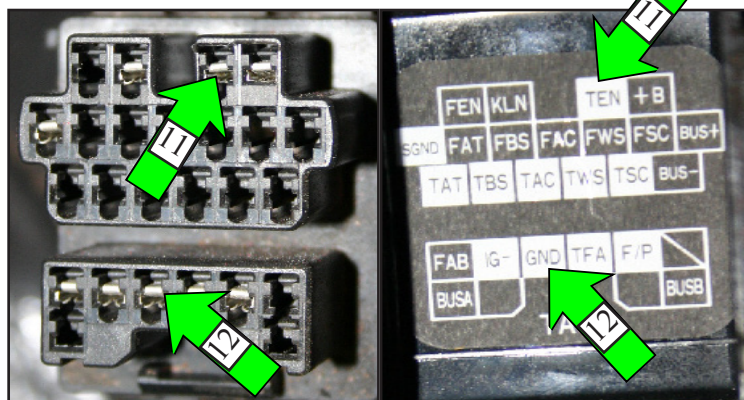


6) Reinstall the crank pulley and spin the bolts in by hand, but don't tighten them. Double-check your notch's orientation (you should double-check the mark on the crank pulley as well, per step 2), and adjust as needed. Once you're sure that's correct, tighten the four bolts to 109 - 151 **IN**-lbs (NOT foot-lbs).

7) Using a feeler gauge, ensure that the gap between the crank sensor and one of the teeth (they're all the same size) on the timing wheel is 0.035", as shown (10). It shouldn't have changed, but this is the easiest way to keep your engine from running. If it's wrong, loosen the bolt and adjust it. 96 - 97 sensors look different, but the same rules apply.



8) Reinstall the alternator belt, then the AC and power steering belt. Start the car and verify your timing with a timing light. Jump "TEN" (11) and "GND" (12) in the diagnosis box (use a short piece of wire to connect the



terminals) to hold the timing at (what the ECU thinks is) 10°. Skipping this jumper will allow the timing to vary and won't give you an accurate reading. Turn as many loads off as possible (HVAC fan, lights, radio, etc.) and be sure the car is warmed up but the fans aren't running while you check the timing.

9) Go drive your car! Keep an ear out for knock. Be sure you're always using the highest octane gas available, and for the first few drives leave the top up, the windows closed, and the stereo off. If you hear anything that sounds like marbles in the engine (i.e., knock / detonation / preignition), immediately stop accelerating. You can continue to drive the car, but don't accelerate as aggressively as what caused the knocking. Once you have a chance, retard the timing a bit, and try again. Knock is more likely to occur in high-load, low-rpm situations (e.g., full throttle at 1200 rpm in fourth) and at torque peak (e.g., 4-5000 rpm in fifth gear).

10) If you need to adjust the timing wheel, you only need to loosen the four bolts holding the crank pulley and timing wheel in place, rotate the wheel as needed, and tighten the bolts back down. If you line up TDC first, as described in step 2, you'll be able to use the notch, as described in step 4. Once you're sure there's no knock, you're done!