

SUPERCHARGER PULLEY INSTALLATION INSTRUCTIONS

FOR: MINI COOPER S (R53): 2002-2006
MINI COOPER S CONVERTIBLE (R52): 2004-2008

WARNING: Undersized supercharger pulleys will produce higher supercharger operating rpms and will supply more air to the engine. Under normal operation, your vehicle demands fuel relative to the mass flow rate of air read by the PCM; therefore, your vehicle will calculate automatically calculate the flowrate of air supplied by the supercharger and will supply proportionately more fuel as programmed in the PCM programming (typically the mini cooper stock tune). Vehicles with inadequate or faulty fuel delivery systems (i.e., faulty or undersized fuel pump, malfunctioning injector, low octane fuel, etcetera) may cause lean conditions which can lead to pre-detonation (i.e., ping or knock) and can cause damage to the engine. This is true for all forced inducted vehicles (including the stock Mini Cooper S); however, there is increased risk of pre-detonation with higher boost pressures and intake air temperatures generated by higher supercharger rpms. Although the pulley sizes and associated boost pressures are safe and reliable for the stock Mini Cooper S engine and drivetrain for the applications described (refer to below recommendations), maintaining adequate fuel delivery is paramount. This is the responsibility of the installer and vehicle operator. Hahn Auto Parts Incorporated (Moddbox) is not responsible for any damage to your vehicle caused by pre-detonation. By installing the Moddbox supercharger pulley, you acknowledge this warning and release Moddbox from all manner of actions, causes, demand for or by reason of any damage, loss or injury to person or property which has been or may be caused in relation to the installation of the pulley.

Please read all directions prior to installing the Moddbox supercharger pulley. Moddbox recommends that installation be performed by a licensed mechanic. Refer to the Moddbox return policy and product disclaimer at modd.me/return-policy.

In the Kit:

1 – Moddbox Patented Pulley Drive Coupler

1 – Moddbox 54.04 mm* Supercharger Pulley (17.5% Overdrive)

*For safe and reliable street and track use¹ applications, Moddbox recommends increased injector sizing and PCM tuning.

1 – Moddbox 55.35 mm** Supercharger Pulley (15.5% Overdrive)

**For daily driving applications, no modification to the stock system is required. Ensure fuel system is working and adequately maintained. Refer to Moddbox Warning above.

Note: Modbox recommends changing spark plugs to a lower heat range (i.e., NKG BKR7EQUP, NGK BKR7E1X-11, or Denso Iridium IK 22). Spark plug replacement not covered in this manual.

Recommended Tools and Equipment Required:

- Moddbox Pulley Wrench
- Moddbox Coupler Torque Wrench/Torque Multiplier
- Allen key or pin (to cage tensioner)
- Socket set (10mm 13mm, 16mm, 17mm, 18mm)
- Pulley puller or Mini Cooper pully puller tool (optional)
- Pry bar or Mini Cooper belt removal tool (optional)
- Jack
- Jack stands
- Torque wrench
- E14 socket
- Socket extensions

The Steps:

1. Disconnect the battery. The battery is located under the floor of the rear cargo area. Once you have safely disconnected the battery, do not close the rear hatch. The rear hatch latching mechanism control is electronic and will not function with the battery disconnected. In the event you accidentally close the rear hatch, there is an emergency release in the back seat area.
2. Jack the front of the car and secure the car on jack stands.
3. Place a jack under the oil pan of the car to raise the engine. Use a softwood or rubber block between the oil pan and the jack to ensure the jack does not damage the pan while lifting. Gently raise the jack until the weight of the engine is transferred to the jack (to allow for engine mount removal in later steps).
4. Remove 6mm radiator hose clamp bolt below intercooler housing to allow for some space.
5. Remove the right-side wheel (passenger side USA/driver side UK) and unbutton the plastic mud guard to allow access to the auxiliary pulleys from below (17mm socket).
6. Completely remove the right engine mount bracket. There are two bolts (16mm socket) on the front and rear of the mount where it bolts to the engine mount. There are two E14 bolts

¹ Track use refers to harsh driving conditions where WOT (wide-open-throttle) and long-duration load is demanded over extended periods.

that connect to the mount where it bolts to the frame.

Note: The E14 bolts are accessible from the bottom. You may need to use the jack to gently raise the engine to remove the mount once it is unbolted.

7. Use the jack under the engine to gently raise the engine. BE CAREFUL to watch the fuel lines, wiring harnesses, etcetera to ensure they are not binding. Raise the engine until the stock centre of the supercharger pulley and shaft is approximately parallel with the subframe.
8. Release the belt with a belt tensioner tool. Use a pin or 4mm diameter Allen key inside the second hole of the tensioner to hold the tensioner open. The hole will become visible as you open the tensioner.

Note: Alternatively, you can use the bolt on top of the belt tensioner as a pry point for a pry bar to push on the stock tensioner pulley to lift/loosen the belt. To do this, loosen the top tensioner mount bolt and back it out about 10-12 mm. This will allow plenty of room to securely leverage and pivot a pry bar to lift/loosen the belt and tensioner.

9. Completely remove the hydraulic belt tensioner (4bolts) and stock serpentine belt.

Note: It is easier to partially lower the engine to access the bolts from beneath.

10. Locate the stock supercharger pulley and measure/record the distance from 1st pulley rib to supercharger snout.

Note: Recommend taking a photograph with a ruler to aid in the alignment of the new pulley.

11. Remove the old pulley with a pulley puller or a Mini Cooper pulley puller tool. The stock pulley is pressed (interference fit).

Note: Avoid the use of heat as the seals and bearings of the supercharger snout are close to the mating surfaces.

12. Clean the supercharger shaft.

Note: If the shaft is corroded, it works well to use a band of emery cloth and wrap the cloth 180 degrees around the shaft and polish until corrosion is removed. Do not over polish! Over polishing or sanding may put your shaft tolerances out of specification.

13. By hand, unthread the nut on the Moddbox Patented Pulley Drive Coupler (this allows the coupler to contract the mating bore diameter). Once contracted, slide the Moddbox Patented Pulley Drive Coupler into the desired Moddbox Supercharger Pulley (size of your choice). Using your fingers, push the drive coupler deep into the pulley's bore until it hits the stop, then snug the nut (finger tight).

14. Slip the Moddbox Supercharger Pulley and Moddbox Patented Pulley Drive Coupler assembly onto the supercharger shaft. Slide the pulley to an offset (rib to snout) that measures approximately 2 mm larger than previously recorded in Step 10 (i.e., ~2mm further away from the supercharger). Refer to Figure 1 below.

Note: The coupler should slide onto the supercharger shaft freely. If it is too snug, use your fingers to loosen the coupler. Also, the additional 2 mm in the initial offset is to allow for the axial movement during torquing of the coupler nut. Tightening the coupler nut will pull the pulley in toward the snout based on how many turns are required to meet the specified torque.



Figure 1 – Moddbox Supercharger Pulley and Moddbox Patented Pulley Drive Coupler on shaft

15. Using tightly tolerance Moddbox Pulley Wrench, carefully slide the wrench over the outer lip/hex of the Moddbox Supercharger Pulley. Use a pipe to securely hold and leverage the pulley tool.

Note: If you do not have the Moddbox Pulley Wrench, carefully use an alternate tool using tape or alternate padding to avoid marking or damaging the pulley ribs or CNC machined and anodized hex.

16. Using the Moddbox Coupler Torque Wrench/Torque Multiplier and your standard torque wrench (refer to Figure 2), lightly tighten the Moddbox Patented Pulley Drive Coupler approximately 10 lbft. Measure the new pulley offset between the Moddbox Supercharger Pulley and the supercharger snout and compare the measurement to the one measured in Step 10. The offset should be ~1 mm greater than the offset in step 1 (pulley is ~1 mm further from the supercharger snout).

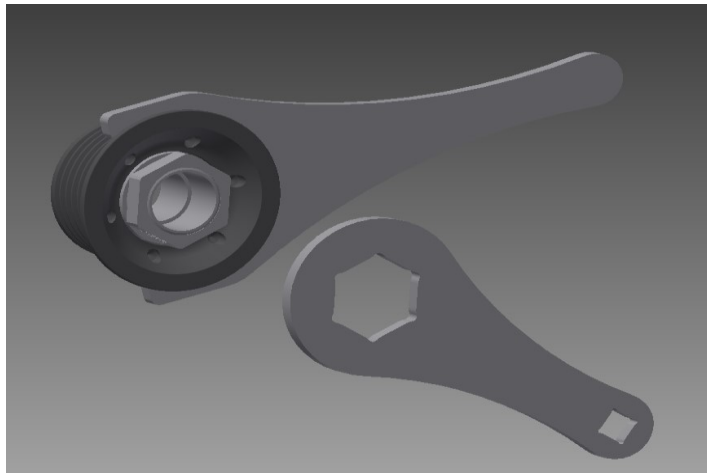


Figure 2 – Moddbox Pulley Wrench and Moddbox Coupler Torque Wrench/Torque Multiplier on pulley

17. Using the Moddbox Coupler Torque Wrench/Torque Multiplier and your standard torque wrench, torque the nut to **60 lbft** (achieves 80 lbft torque on the nut using the tool).

Note: If you do not have the Moddbox Coupler Torque Wrench/Torque Multiplier and you are torquing the nut on the Moddbox Patented Pulley Drive Coupler using a standard socket directly connected to your torque wrench, set the torque to 80 lbft. Due to the narrow clearance between the Mini and the subframe, the engine may need to be lifted higher to directly connect your torque wrench to the nut if there is not sufficient room for your torque wrench and socket. Moddbox does not recommend lifting the engine higher and recommends using the tool.

18. Measure the new pulley offset between the Moddbox Supercharger Pulley and the supercharger snout and compare the measurement to the one measured in Step 10. Ensure that the offset new offset is within ~0.5 mm of the Step 10 measurement (Refer to Figure 3).



Figure 3 – Installed Moddbox Supercharger Pulley with correct offset

19. Install the new belt.
 - a. For 15.5% Pulley use a Gates **060535** Belt
 - b. For 17.5% Pulley use a Gates **060535** Belt

Note: Reference serpentine belt routing diagram below (Figure 4):

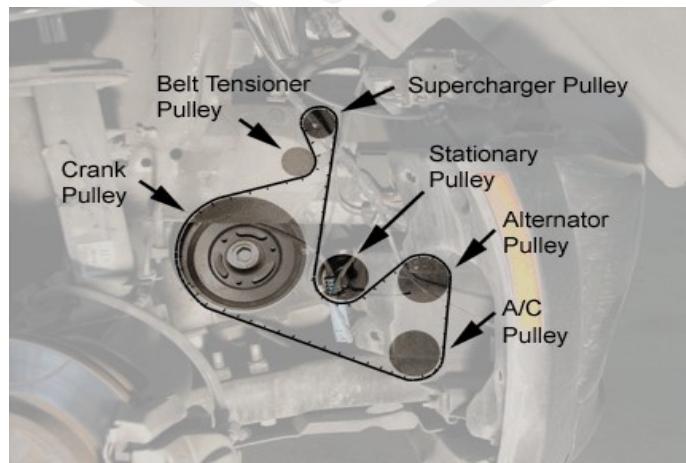


Figure 4 – Installed Moddbox Supercharger Pulley with correct offset

20. Reinstall the tensioner assembly and bottom-half of the engine mount (refer to Figure 5). Release pin from tensioner to tension belt.



Figure 5 – Pulley, bottom-half of engine mount, tensioner, and belt installed

21. Re-install wheel, and mud guard.
22. Re-install top-half of engine mount and securely bolt the engine back in place
Note: You will need to raise and lower the engine. Rocking engine and raising/ lowering may be necessary to get the engine mount to slip into its position on the mounting bracket.
23. Re-install hose clamp, and double-check that all removed or disassembled components are back in place and securely fastened.
24. Lower the car off of the jack stands and reconnect the battery.

Happy Boosting! – The Moddbox Team

Moddbox