Miata to V6 Conversion Kit

Data Sheet

About OZ Engineering:

We are a multi-generational team of 3 with ages ranging from 52 to 93. Back in the 60's the OZ (Gary Sr.) started putting big engines into small cars. When Jr. came along, they started racing Go-Karts, Formula Fords and then GT1 cars. Fred was a veteran of World War II. He was a Marine. He was a machinist before World War II, machining parts for earth moving equipment. After the war he worked at different shops and became a tool & die maker. Later, he opened his own shop and did specialty work. His work is very precise with great attention to detail.

Product Description & Cost:

This kit was designed to put a Honda V6 VTEC engine into a 1989-2005 Mazda Miata.

Stage 1 Kit: $2,995
Stage 2 Kit: $3,495

PLEASE SPECIFY WHICH ENGINE YOU WILL BE INSTALLING WHEN PLACING THE ORDER

State 1 Kit Contains:

* Billet Aluminum adapter to join the Honda engine to the Miata transmission with hardware **(this will vary depending upon which engine you are installing, please specify)**
* Aluminum crankshaft extension with hardware
* Aluminum starter motor adapter with hardware
* Aluminum rear sump oil pan
* Oil pan pick-up
* Starter motor cover
* Engine mount adapters to join engine to stock cross-member. Re-use stock motor mounts or upgrade to Mazda heavy duty mounts.
* Throwout bearing sleeve for hydraulic throwout bearing
* Fitting to connect clutch slave cylinder to the hydraulic throwout bearing

Stage 2 Kit Contains:

Everything in Stage 1 PLUS

* Custom cooling manifold that routes the supply & return hoses from the back of the engine to the front
* An inline Meziere thermostat
* It has provisions for the heater hose connections & engine coolant sensor bungs for the pcm & dashboard gauge. this option cleans up the engine bay considerably and makes installation a breeze

Additional Parts (not included)

1. **Honda V6 Engine**
   We recommend either the 3.2 Liter J32A2 from the 2002-2003 Acura TL Type-S (260 hp), the 3.5 Liter J35A4 from the 2002-2004 Honda Odyssey (240 hp), or the 3.5 Liter J35A8 from the 2005-2008 Acura RL (290 hp). The J35A8 was on the Ward's 10 Best engines list for 2005, 2008, and 2009.

2. **ACT Streetlite Flywheel PART# ACT 600110**

https://www.maperformance.com/collections/all-drivetrain-components/products/act-streetlite-flywheel-integra-90-01-civic-si-99-00-del-sol

3. **ACT Pressure Plate PART# ACT H025X**

https://www.maperformance.com/products/pressure-plate-xtreme-for-acura-integra-honda-civic-si-cr-v-by-act-clutch-kits-and-flywheels?variant=5328868291

Miata V6 Conversion Kit

Data Sheet (continued)

4. 1.8L Miata Clutch Disk or
   ACT Performance Custom Disk #3001817
   Call ACT at 661-940-7555 to order
   (Not available online)

5. ACT Pilot Bearing (PB1002)

https://www.maperformance.com/products/act-pilot-bearing-multiple-fitments-pb1002

6. New Starter compatible with
   2017 Honda Ridgeline

https://www.rockauto.com/en/moreinfo.php?pk=10369276&cc=3435188&jsn=807&_nck=Ekt6BqBF1pwlXdx0gYlm1eLc36x7RagAV9qWoBGYzks2kIIGcMG-

7. Chevy Hydraulic Throwout Bearing Install Kit

https://www.speedwaymotors.com/Chevy-Hydraulic-Throwout-Bearing-Install-Kit-GM-Release-Bearing,379207.html?NoRedirect=true&OriginalQuery=91605004

8. Longacre® 52-45120 Brake line - 16 in #4 w/ #4 AN both ends
   https://www.speedwaymotors.com/Longacre-52-45120-Brake-line-16-in-4-w-4-AN-both-ends,282697.html

9. ARP - 108-2202 Pressure Plate Bolt Kit

https://www.amazon.com/dp/B001VAJYBO/ref=cm_sw_em_r_mt_dp_ngXdGbMPTFH5N

10. Honda Bond-4

https://www.amazon.com/Honda-08717-1194-Original-Equipment-Manufacturer/dp/B0083BWULK/ref=sr_1_25?dchild=1&keywords=honda+-bond&qid=1614188270&s=automotive&sr=1-25

11. Engine Computer and Wiring Harness. You can use a modified wiring harness and computer for the J-Series V6. For the Early Honda V6 these are available from Brandon at Kraut n Rice. Call Brandon at (480)469-6010 and let him know that Oz Engineering referred you. If you are using the Late Honda V6 with round bellhousing we recommend the using the MS3Pro EVO3 available from DIYAutoTune.com. Ask for Matt Kramer at (678)-261-8789
    https://www.diyautotune.com/product/ms3pro-evo-stand-alone-engine-management-system/

12. Custom Exhaust from Honda Exhaust Manifolds to Miata Exhaust system, you can go to your local muffler shop for this.

13. Plumbers putty (local hardware store)

Product Features:

- *Retention of the stock Miata cross member, engine mounts, transmission, power steering pump, and radiator*
- *Custom oil pan sits higher than the underside of the Miata cross member with a 5qt. capacity.*
- *Custom adaptor specifically designed to join an early or late model Honda V6 engine to the Miata 5 or 6 speed manual transmission.*
- *Drive train vibrations are minimized by the alignment of the crankshaft centerline from the Honda V6 to the original Miata engine.*

Applications:

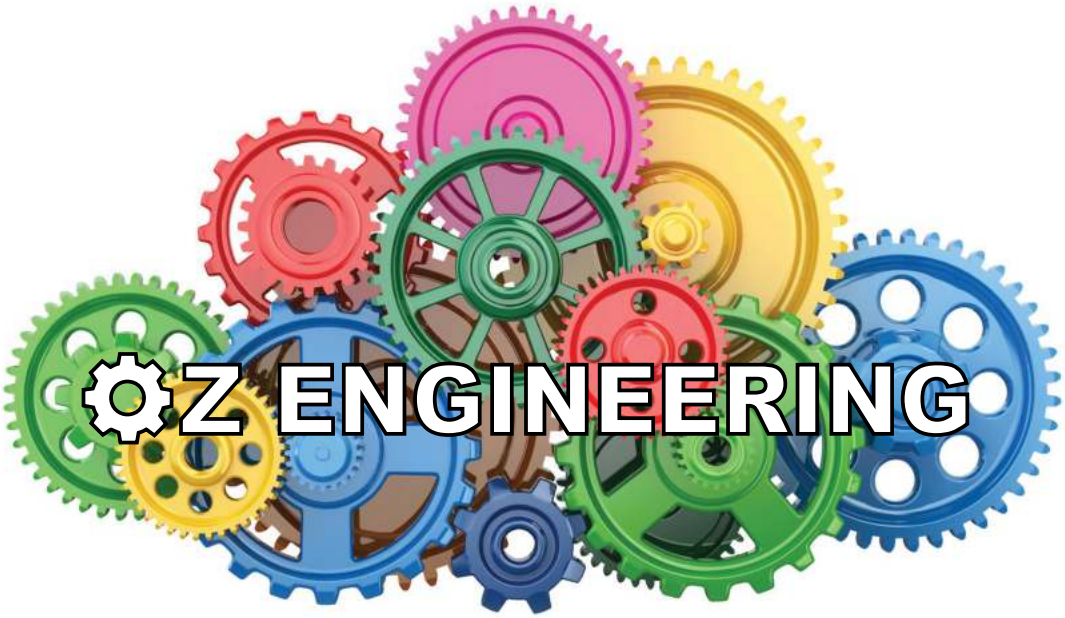
1989-2005 Mazda Miata with manual transmission

Questions?
Not sure if this will work for you?
Send us an email, we will help!

Email us at: OZENGMIATAJV6@gmail.com

Thank you for choosing OZ Engineering
we look forward to partnering with you to make your automotive dreams come true!

Made in the USA



Honda V6 VTEC Engine
into a 1989-2005 Mazda Miata

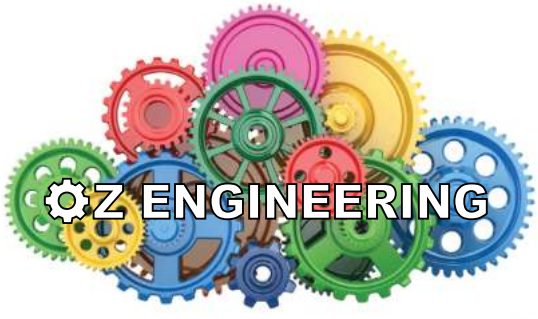
INSTALLATION GUIDE

What's inside:

	Billet aluminum adapter with hardware to join the Honda engine to the Miata transmission
	Billet aluminum crankshaft extension with hardware
	Billet aluminum starter motor adapter with hardware
	Aluminum rear sump oil pan
	Oil pan pick-up
	Starter motor cover
	Engine mount adapters to join engine to stock cross-member
	Throwout bearing sleeve for hydraulic throwout bearing
	Steel Clutch Adapter Fitting to connect the clutch master cylinder hard line to the hydraulic throwout bearing braided line

MIATA/HONDA TORQUE SPECS

Flywheel	19 foot-pounds *(228 inch-pounds)* then to 38 foot-pounds then to 57 foot-pounds and then to 76 foot-pounds
Pressure Plate	5 foot-pounds *(60 inch-pounds)* then to 10 foot-pounds *(120 inch-pounds)* then to 14 foot-pounds *(168 inch-pounds)* and then to 19 foot-pounds *(228 inch-pounds)*
Transmission Adapter to Engine Block Bolts	47 foot-pounds
Engine Mount Brackets to Engine Block Bolts	28 foot-pounds
Miata Transmission to Adapter	M12x1.75 bolts **47 foot-pounds** M10x1.50 bolts **28 foot-pounds**
Oil Pan Bolts	M6x1.0 bolts **8.7 foot-pounds** *(104 inch-pounds)*



INSTALLATION

✔ **Step 1:** Remove the ground wire from the Miata battery located in the trunk

✔ **Step 2:** Drain the transmission fluid & the engine coolant

✔ **Step 3:** Remove the stock Miata engine and transmission

✔ **Step 4:** Separate the engine from the transmission and place the transmission on your work bench

✔ **Step 5:** Below are the tools you will need to make a cutout in the transmission bellhousing for the starter & drill for a new 3/8" dowel pin.

Tools:

- 4-1/2" grinder with a .040 cut off wheel
- Chicago saw from Harbor Freight
- Drill with a 3/8" chuck.

(The drill bit for the dowel pin is included in the kit).

Refer to this video:
https://youtu.be/llqyY-QGsVU

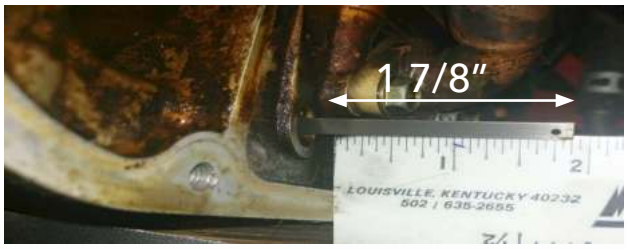
✔ **Step 6:** Mount the supplied Billet Aluminum Adapter Plate to the Miata transmission & drill for the new 3/8" dowel pin.
Refer to this video:
https://youtu.be/uLVLTjlRAnw

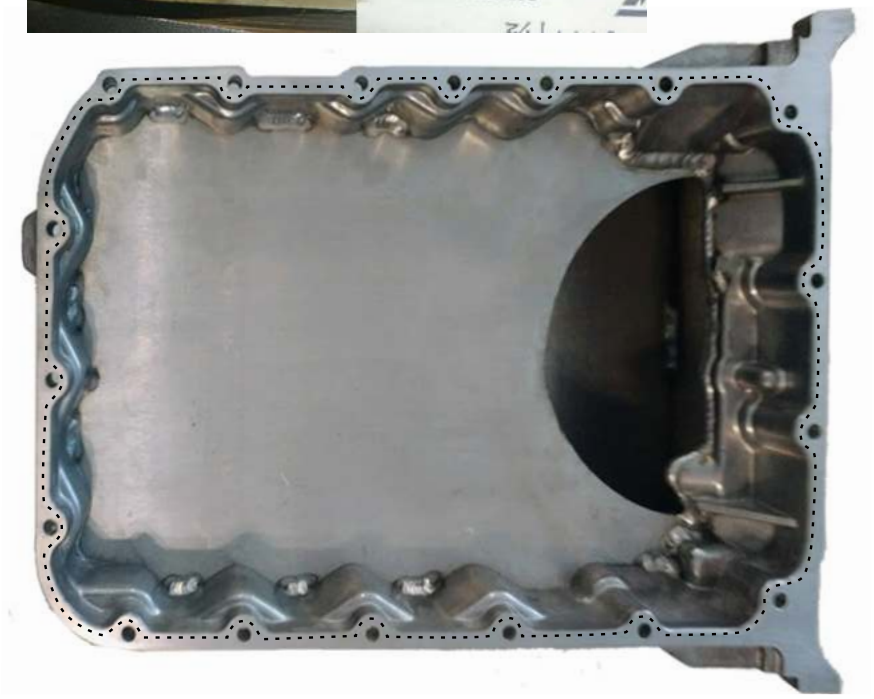
✔ **Step 7:** Make the cut out in the transmission bellhousing for the starter.
Refer to this video:
https://youtu.be/Hopa7GV-uYU

✔ **Step 8:** Mount the Starter to the Adapter Plate:
Refer to this video:
https://youtu.be/Y6y4GxiSAxY

INSTALLATION

✔ **Step 9:** Oil Pan Installation





- Insert oil dipstick
- Trim dipstick to 1 7/8" from oil pan mating surface
- Remove the stock Oil Pickup from the engine
- Save the bolts & O-ring
- Remove any old liquid gasket from the engine block mating surface
- Clean and dry the engine block mating surface
- Install the supplied oil pickup with O-ring and 3 bolts (2 bolts at the oil pump connection and 1 bolt for the pickup brace)
- Torque the bolts to 8.7 foot pounds
- Install the 4 supplied 6mm studs in locations 11, 12, 15 & 17 shown on diagram on page 5, set height at 1 9/16" above the engine block.
- Apply liquid gasket, (Honda Genuine HONDABOND 4) evenly to the oil pan mating surface along the dotted line in the photo above.

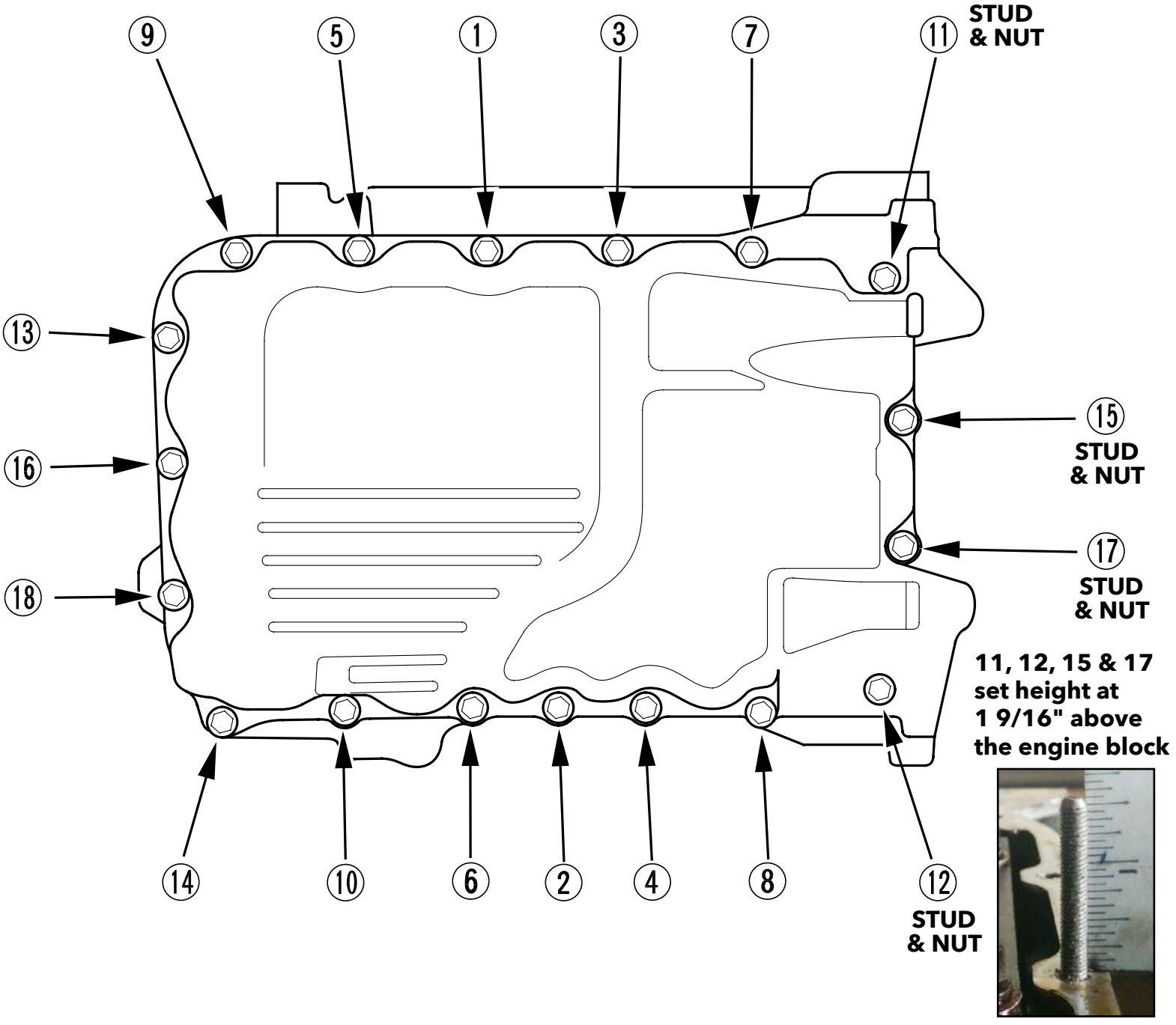
Refer to this video: https://youtu.be/hglYLxzqsGw

***NOTE**: Do not install the oil pan if 4 minutes or more have elapsed after applying liquid gasket. Instead, remove the old residue and reapply liquid gasket.*

- Install the oil pan on the cylinder block.
- Tighten the bolts in two or three steps per bolt tightening sequence. *See drawing on page 5.*
- In the final step, tighten all bolts in sequence to **8.7 foot-pounds**

INSTALLATION

Oil Pan Bolt Tightening Sequence



INSTALLATION

✔ **Step 10:** Adapter Plate, Engine Mounts, & Flywheel Installation

- Cut (2) pieces of the Honda engine flashing that protrude past the transmission mounting surface to allow the billet adapter plate to sit flush on the back of the engine.

- Bolt the rubber Miata engine mount to the driver's side engine mount adapter & torque to 50 foot-pounds.

- Mount the supplied Engine Mount Adapter for the driver's side of the engine using (3) 12mm flanged bolts provided and progressively torque to 28 foot-pounds.

- **Note:** Do **NOT** mount the supplied Engine Mount Adapter to the passenger side of the engine at this time. It will be installed at **Step 14**.

- Mount the supplied Adapter Plate to the Engine over the dowel pins and install the (6) 12mm bolts provided and torque progressively to 47 foot-pounds.

- Place the supplied Crankshaft Extension on the end of the crankshaft and line up the (8) holes

- Place the Flywheel on the Crankshaft Extension, install the (8) crankshaft bolts provided and progressively torque to 76 foot-pounds in a crisscross pattern.

- Mount the starter motor adapter to the main adapter using the (2) 10mm bolts provided and torque to 28 foot-pounds.

- Mount the starter motor to the adapter using the (2) 10mm bolts provided and torque to 28 foot-pounds.

- Use a screwdriver to push the starter gear into mesh with the Flywheel ring gear.

  Verify that the gear clearance is between 0.020 and 0.030
  If insufficient, add the 0.010 shim that comes with the Honda starter and recheck.

Refer to this video:
https://youtu.be/_-F83kDOqaw

INSTALLATION

✔ **Step 11:** Clutch installation and hydraulic throwout bearing adjustment

- Place the Clutch disk against the Flywheel and use a Miata clutch line up tool to center the clutch disk with the pilot bearing in the flywheel.

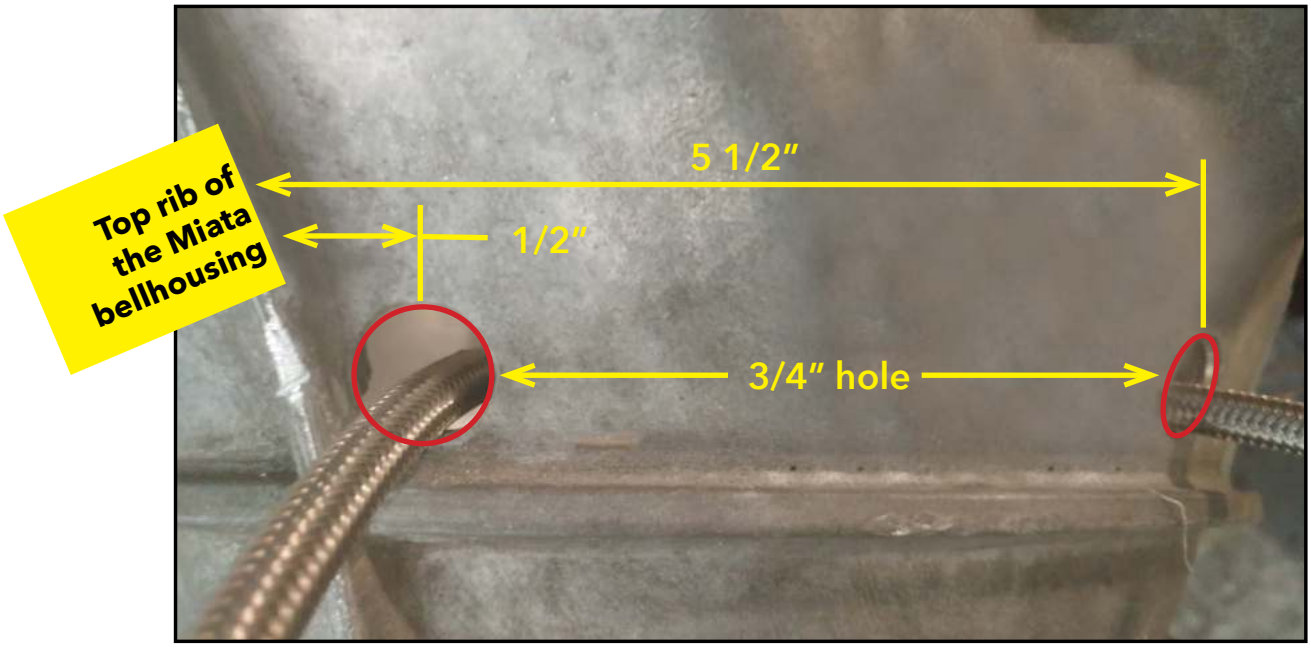
- Position the Pressure Plate over the dowel pins in the flywheel & install the pressure plate bolts. Progressively torque these bolts to 19 foot-pounds to evenly tighten the pressure plate to the flywheel. See the torque spec page for torque progression.

- Place the supplied throwout bearing sleeve over the input shaft collar on the Miata transmission and using a plastic hammer, gently tap the sleeve until it bottoms out on the shoulder on the input shaft collar. It's a snug fit so hammer it on evenly to prevent it from cocking on the way down.

- Remove the bolt at the 12 o'clock position on the input shaft collar & replace it with the stud with the rubber cover. This stud prevents the throwout bearing from spinning during engine operation.

- Using a 3/4" hole saw make (2) holes in the Miata transmission to route the supply & bleeder line to the hydraulic throwout bearing.

See picture below for location of holes.



INSTALLATION

- Install the hydraulic throwout bearing over the throwout bearing sleeve.
    - Put the **12" long** bleeder line (that comes with the throwout bearing kit) through the 3/4" hole at the top of the transmission.
    - Put the **16" long** supply line (#8 from the Data sheet) through the 2nd 3/4" hole.
    - Adjust the clearance between the face of the throwout bearing and the fingers on the pressure plate.
    - Clearance should be between 0.125 to 0.200 and adjusted using the shims that are included with the throwout bearing.
    - Use (5) shims as a starting point.

Note: this clearance is required to allow room for the pressure plate fingers to rise as the clutch disk wears thinner.

- Connect the supplied Steel Clutch Adapter Fitting to the hydraulic throwout bearing supply line & tighten. This fitting adapts the hard line coming from the Miata Clutch master cylinder to the throwout bearing.

Refer to these videos:
https://youtu.be/6_P7nfnj5cA
https://youtu.be/m6z8n5NRzhA

✔ **Step 12:** Transmission installation to the engine

- Slide the transmission input shaft into the clutch assembly on the engine being careful to keep the bellhousing parallel with the adapter plate.

- Line up the transmission with the large hollow dowel pin and 3/8" solid dowel pin in the adapter plate & push it flush to the adapter.

- Install the (9) bolts that are included to secure the transmission to the adapter
- Torque: 28 foot-pounds for the smaller 10mm bolts
  47 foot-pounds for the larger 12mm bolts

Note: ensure the bolts don't extend more than 3/4" past the transmission bellhousing so the bolts don't bottom out on the face of the adapter plate.

INSTALLATION

✔ **Step 13:** Cut out for Starter Cover in passenger footwell

- Remove the carpeting at the passenger side footwell by the transmission tunnel

- If your Miata has AC, remove the drain hose from the nipple on the evaporator drain pan.

- Position the supplied starter motor cover cutout pattern in the tunnel and using a sharpie marker, trace the inside of the cover pattern into the sheet metal tunnel.

- Cut out the starter cover hole using a grinder with a 4 1/2" cutoff wheel or sheet metal snips or reciprocating saw.

- Debur the opening and paint the raw edges with primer to prevent rust.

- Position the cover over the hole and secure with the supplied sheet metal screws after the engine, transmission, & starter are installed in the Miata.

- Seal the edges of the cover with plumber's putty to prevent water infiltration. Plumbers putty allows easy removal of the starter cover.

Refer to this video
https://youtu.be/zxnZQaviTf8

✔ **Step 14:** Install the Engine/Transmission

- Place the front tires of the Miata on ramps & jack up the rear of the car support with jack stands so that the rear of the car is higher than the front.

- Attach the Engine/Transmission as one unit to an engine crane.
It is recommended to use an engine tilter to hang the engine from the engine crane. This will allow you to vary the angle of the engine/trans and will help when you lower the engine into the engine bay.

INSTALLATION

- Bolt the rubber Miata engine mount to the passenger side engine mount adapter & torque to 50 foot-pounds loosely bolt it to the Miata crossmember so that it is in the engine bay before you lower the engine into place.
- Lower the engine/trans into the engine bay being careful to take your time and prevent clashing with the body of the Miata.
- As you lower the engine into the engine bay adjust the angle of the engine/trans to line up the stud on the bottom of the driver's side engine mount to the original engine mount hole in the Miata crossmember.
- Line up the passenger side of the engine with the passenger side engine mount adapter & install the (4) flanged bolts into the passenger side of the engine & torque to 28 foot-pounds.
- Attach the Miata PPF (power plant frame) to the transmission using the original hardware that was unbolted when the Miata engine was removed.
- Install the Miata driveshaft.
- Install the (2) original nuts that bolt the Miata engine mounts to the crossmember.
- Congratulations! The engine is now installed.
- Fill the transmission with fluid & install the shifter & shifter boot.
- From inside the passenger footwell, install the starter motor & connect the 12-volt cable & solenoid wire to the starter.

- Install the starter cover.
  - If you have AC put the drain hose from the evaporator thru the grommeted hole in the starter cover.
  - Connect the drain hose to provided 3/8" barb splice connector on the drain from the evaporator
  - Add provided hose to barb fitting and tie-wrap along chassis to drain below frame rail.

INSTALLATION

✔ **Step 15:** Clutch hydraulic line

- Connect the flex line from the Miata clutch master cylinder to the adapter fitting on the hydraulic throwout bearing & tighten firmly.

- Fill the clutch master cylinder & bleed the throwout bearing using the bleeder line at the top of the transmission.

- If bled correctly there should be a little free play and a firm pedal.

✔ **Step 16:** Exhaust, Engine computer, cooling, etc.

- Install the Engine computer that runs the engine per supplier's instructions.

- Exhaust system: connection between the Honda exhaust manifold & the Miata exhaust can be done by your local muffler shop. Be sure that there is an oxygen sensor bung included so the oxygen sensor can be installed. This is critical for the engine management system. We recommend a free-flowing single 2 1/2" exhaust system for best performance.

- Coolant temperature sensor for the dashboard gauge: remove the coolant temperature sensor for the dash gauge from the original Miata engine and install in the water jacket on the Honda engine. Maintain the Miata wiring that went to this sensor. We supply a mounting bung for this sensor on the optional water manifold.

- Oil pressure sensor for the dashboard gauge: remove the oil pressure sensor for the dash gauge from the original Miata engine and tee it into the oil pressure port on the Honda engine. This port is right next to the Vtec solenoid on the passenger side of the engine. Maintain the Miata wiring that went to this sensor.

- Engine coolant hoses going to the radiator are by the customer. We include the hoses in our optional water manifold kit along with an inline thermostat.

INSTALLATION

✔ **Step 17:** Pre-flight checks

- Fill the radiator with coolant & run the engine in the car until the thermostat opens.
    - Add coolant as necessary & put the radiator cap on and check for leaks.
    - Watch the temperature gauge on the dash periodically to make sure the car doesn't overheat & the oil pressure gauge to ensure that you have oil pressure.

- Turn the car off & check the oil level and for any leaks. Adjust if necessary.

- Double check all the bolts, nuts, & clamps before your first drive.

- Go slow on your first drive and watch the gauges for any issues with the coolant temperature or oil pressure.

- The Honda V6 completely transforms the Miata. The torque will accelerate it briskly with just a slight press on the throttle.

- Enjoy your transformed Miata! Your Miata is now the car that we wished that Mazda would have built.