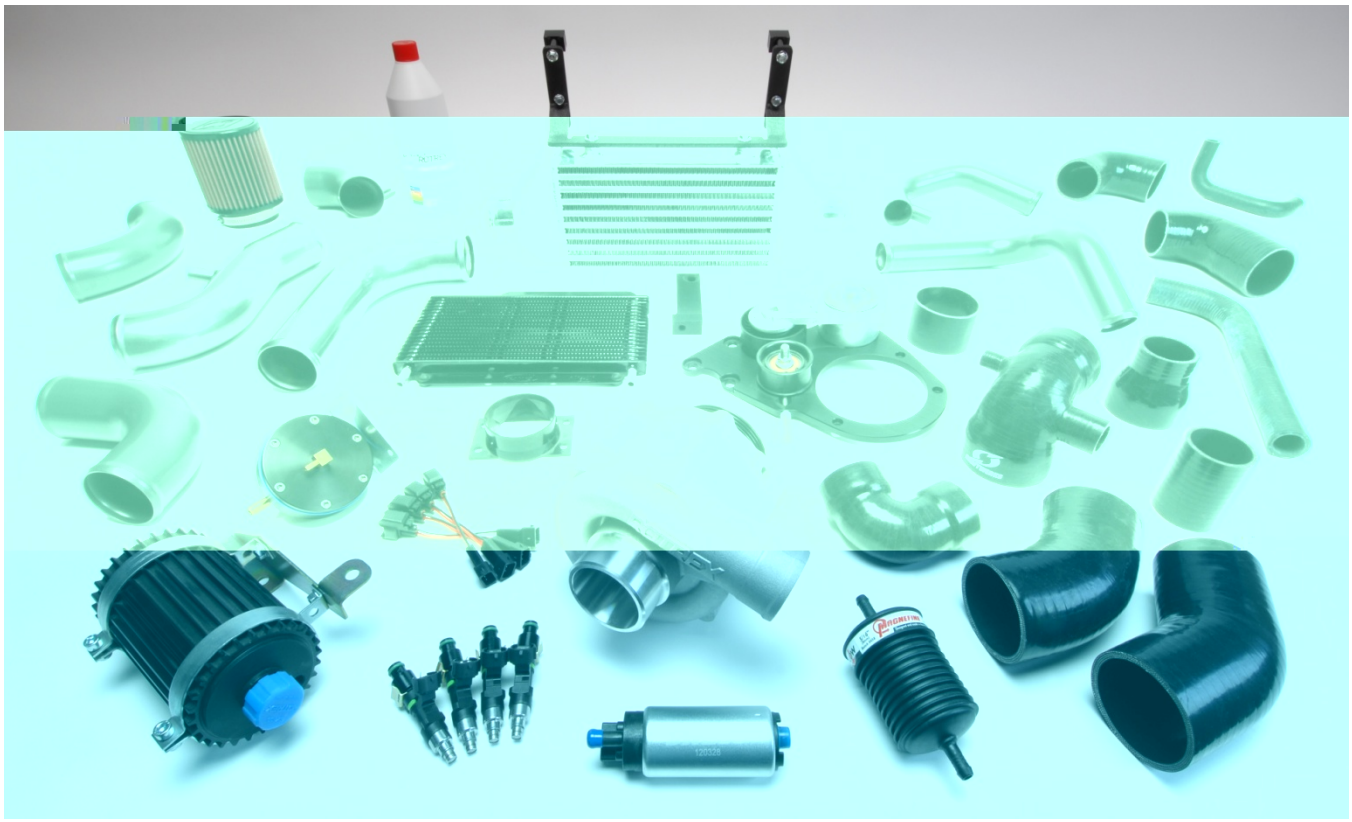
’90-’93 MAZDA MIATA SUPERCHARGER KIT



The KraftWerks ’90-’93 Mazda Miata Supercharger Kit was designed for easy installation. Competent mechanics with the appropriate tools will find the process to be relatively simple. This is a general installation guide; each installation may vary slightly. Please keep these key factors in mind before proceeding:

- Review entire installation guide before attempting install. If you have any questions about your ability to perform this installation, take your vehicle to a qualified performance shop for installation.

- A minimal amount of work underneath the vehicle is required. If you don’t have access to a lift, then a floor jack and jack stands will be required. **Never work underneath a vehicle without appropriate jack stands.**

- Always wear safety glasses when working on your vehicle.

- **Warning: engine rev limiter must be set below 7,400 rpm.** Over-spinning the Rotrex supercharger will void its warranty.

- KraftWerks Supercharger kits do not require break-in or warm-up periods. However, always warm your engine up properly before operating at full boost.

- If an engine oil and filter change has not been performed recently, do so now using high-quality, synthetic oil.

- **A minimum of 91 octane, premium-grade fuel must be used.**

- One-step colder spark plugs are recommended. Talk to your KraftWerks representative about our line of NGK Iridium spark plugs.

- Fuel filters with more than 50,000 miles of use must be replaced prior to operating engine under boost. This is critical to proper fuel flow and engine performance.

- For vehicles with more than 100,000 miles of use, consider installing a new radiator and thermostat. Water with high calcium contents can leave deposits over time that can inhibit proper cooling once supercharged.

- This KraftWerks Supercharger kit is not compatible with factory strut tower brace.

- **Only use genuine Rotrex SX100 Traction Oil for supercharger lubrication.** The proprietary traction formula protects the supercharger where other oils would fail, and is what allows its high-rpm operating level.

- **Important: keep all pipes and hoses sealed and clean until installation.** The Rotrex supercharger operates at speeds as high as 120,000 rpm on the Mazda Miata. Any debris that inadvertently enters the inlet pipes or becomes stuck to the silicone hoses can enter the supercharger and will damage its compressor blades. Compressor blade damage is not covered by the Rotrex two-year warranty.

- **Never rotate the Rotrex supercharger counter-clockwise.**

- Required tools:
  - 8mm to 22mm metric wrench set
  - 8mm to 21mm metric socket set
  - Screwdriver set
  - Metric Allen wrench set
  - Needle-nose pliers
  - Hose cutters

SECTION 1: PRE-INSTALLATION AND REMOVAL:

For the following steps, please refer to the factory service manual. Do not discard any parts, which may be reused during installation.

Step 1: Remove negative battery cable.

Step 2: Remove fuel cap to relieve fuel system pressure.

Step 3: Remove air intake system, including MAF (mass air flow) sensor and crankcase breather hose.

Step 4: Remove plastic under-tray.

Step 5: Remove front bumper.

SECTION 2: MOUNTING BRACKET AND SUPERCHARGER INSTALLATION:

Step 1: Remove power steering hose bracket. Loosen 22mm nut that secures upper power steering hose and rotate hose toward rear of engine bay. (See Figure 1)

Figure 1: Power steering hose rotation

Step 2: Remove power steering adjustment bracket. (See Figure 2)

Step 3: Remove power steering pivot bolt and nut. Reinstall bolt in reverse from exhaust side with threads facing radiator. Do not thread nut into place yet.

Figure 2: Power steering adjustment bracket

Figure 3: Supercharger support bracket

Step 4: Remove engine lift bracket from cylinder head and install supercharger support bracket using supplied M10x1.25 bolt. Hand-tighten only. (See Figure 3)

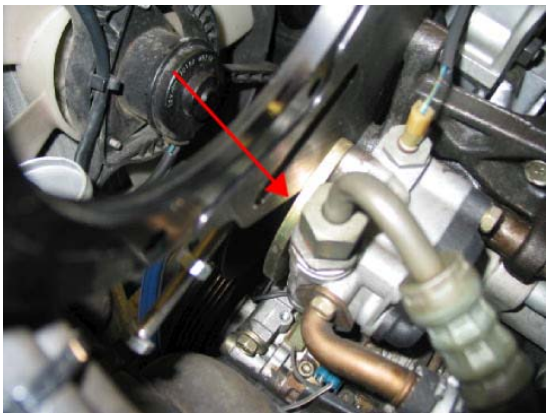


Figure 4: Power steering spacer

Step 5: Install power steering spacer onto power steering pump using previously removed power steering adjustment bracket lower bolt only. (See Figure 4)

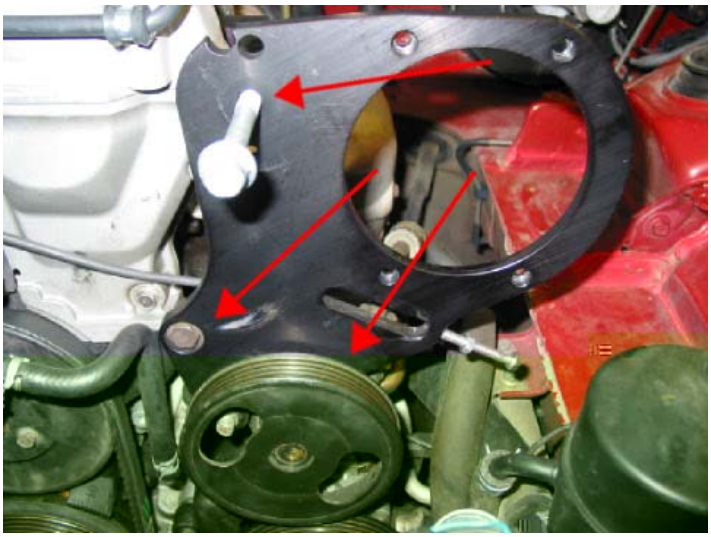


Figure 5: Supercharger mounting bracket

Step 6: Lower supercharger mounting bracket into original power steering adjustment bracket location. Insert remaining power steering adjustment bracket bolt through supercharger mounting bracket hole, through power steering spacer upper hole, and thread into power steering pump (See Figure 5, lower arrow.)

Step 7: Install supplied, special M8x1.25 flange bolt (shortened head) through supercharger mounting bracket and thread into engine block (See Figure 5, middle arrow).

Step 8: Temporarily insert supplied M10x1.25 automatic tensioner flange bolt through supercharger bracket and thread into supercharger support bracket for alignment. (See Figure 5, upper arrow)

Step 9: Reinstall original power steering pivot bolt nut from Step 3.

Step 10: Tighten remaining supercharger mounting bracket, supercharger support bracket, and power steering bolts/nuts to 20 lb-ft. Once tightened, remove previously installed automatic tensioner bolt.

Step 11: Position automatic tensioner's rear alignment tab into supercharger mounting bracket's cutout. Install previously used M10x1.25 flange bolt through automatic tensioner, through supercharger mounting bracket, and thread into supercharger support bracket. Tighten bolt to 20 lb-ft.

Step 12: Fasten supercharger to supercharger mounting bracket using four supplied M6x1.0 Allen bolts. Tighten bolts evenly to 6.6 lb-ft. Apply a conservative amount of Loctite to threads before installation.

Step 13: Examine alternator belt and replace if worn. Replace power steering / A/C belt with supercharger serpentine belt.

Step 14: The following procedure is required for the automatic belt tensioner to function properly: Using a 3/8"-drive ratchet, hold automatic belt tensioner in "open" position and tighten pre-installed static tensioner's adjustment bolt, located on the side of the supercharger mounting bracket. Continue tightening until the gap between the power steering pulley and the automatic belt tensioner pulley is a minimum of 1/2". Once adjusted, tighten static tensioner's mounting nut. (See Figure 6)

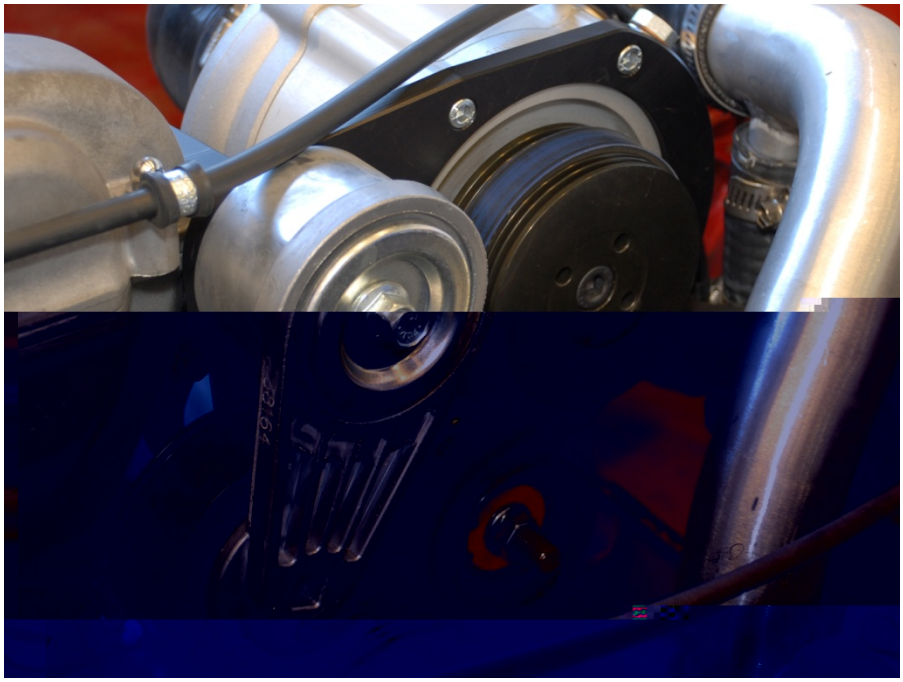


Figure 6: Belt tensioner system

SECTION 3: OILING SYSTEM INSTALLATION:

The following steps require removing the plastic fasteners that secure the front bumper and inner fender liners. These fasteners become brittle over time and can easily break upon removal. Be prepared to replace them prior to installing the supercharger system in the event that they are damaged.

Figure 7: Oil cooler mounting

Step 1: Mount oil cooler in front of A/C condenser, replacing existing front, top, and bottom driver-side A/C condenser bracket bolts with supplied M6x1.0 hardware. (See Figure 7)

Step 2: Remove horn and relocate to back side of mounting nut using original hardware.

Step 3: Fasten supplied banjo fittings to Rotrex supercharger's and oil reservoir's inlet and outlet ports using supplied crush washers (two per banjo). Do not tighten until hose orientation is complete.

Figure 8: Oil reservoir mounting

Step 4: Remove hood latch bracket. Temporarily install Rotrex oil reservoir and hood latch bracket using supplied M6x1.0 hardware. (See Figure 8)

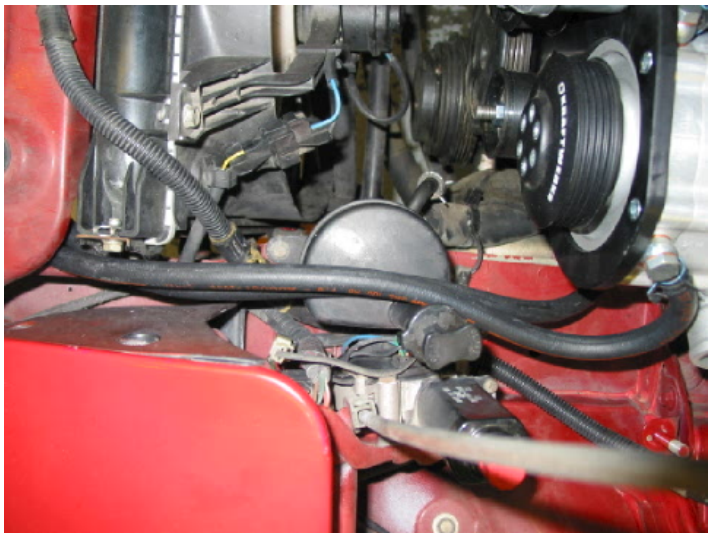


Figure 9: Oiling system hoses

Step 5: Connect 55” oil cooler hose to Rotrex supercharger’s “OIL OUT” port using supplied banjo adapter. Route hose in between driver-side headlight and radiator support. Shorten if necessary. (See Figure 9, 10)

Step 6: Connect 28” oil filter hose to Rotrex supercharger’s “OIL IN” port using supplied banjo adapter. Route hose alongside previously installed 55” hose. (See Figure 9, 10)

Step 7: Connect 11” oil filter hose to Rotrex oil reservoir’s lower outlet using supplied banjo adapter. (See Figure 10)

Step 8: Connect remaining 11” oil cooler hose to Rotrex oil reservoir’s upper inlet using supplied banjo adapter. (See Figure 10)

Step 9: Tighten all banjo connections. A properly installed and leak-free oiling system is crucial to the supercharger’s longevity. Double-check all hose and fitting connections before moving forward.

Step 10: Fill Rotrex oil reservoir using supplied Rotrex Traction Oil per instructions on page 14.

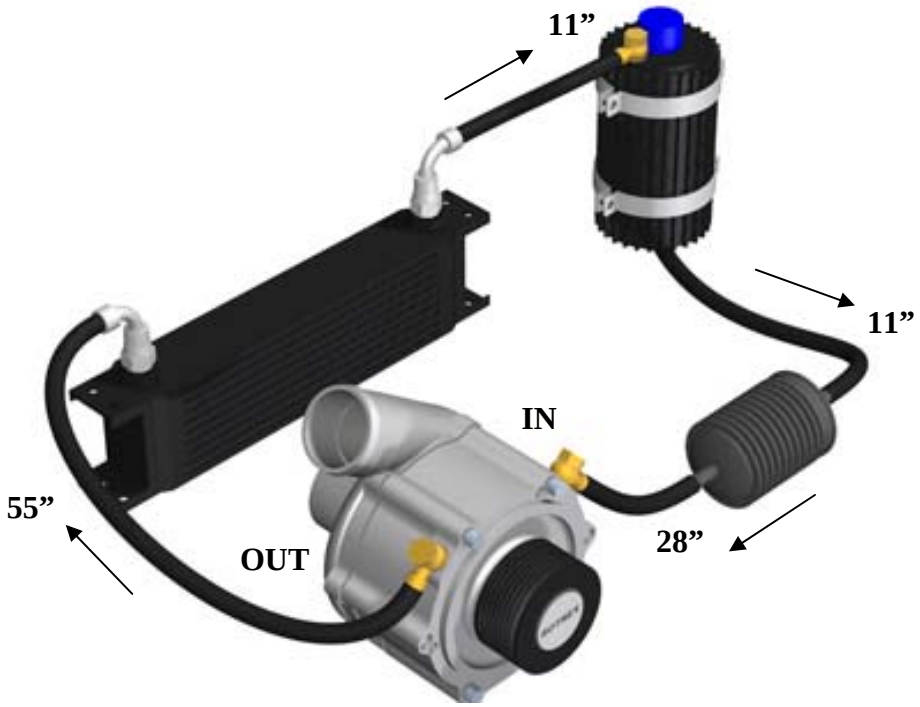


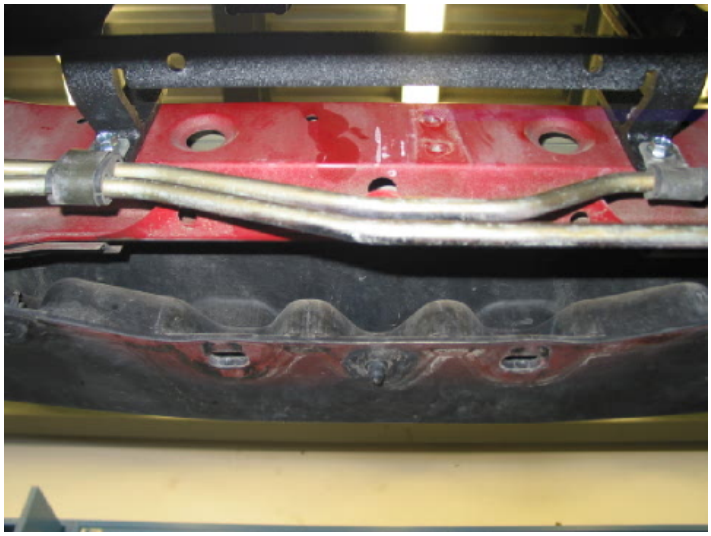
Figure 10: Oiling system diagram

SECTION 4: INTERCOOLER INSTALLATION:

Step 1: Remove power steering cooling tube's (located behind front bumper support) two mounting bolts. Temporarily allow tube to hang.

Step 2: Temporarily unbolt previously mounted Rotrex oil reservoir and hood latch bracket.

Step 3: Install intercooler bracket using previously removed power steering cooling tube hardware.



Step 4: Reinstall power steering cooling tube to

tep 5: Fasten intercooler to intercooler bracket

tep 6: Reinstall Rotrex oil reservoir and hood

SECTION 5: INTERCOOLER PIPING INSTALLATION:

Step 1: Fit supplied slotted clamps onto

tall

Step 2: Connect this series of hose adapters and tubes in this sequence, starting from passenger-side intercooler outlet, using supplied hose clamps (See Figures 13, 14):

- 2-1/2", 45-degree silicone hose adapter (from intercooler outlet)
- Tube # 1
- 2-1/2", 90-degree silicone hose adapter
- Tube # 2
- 2-1/2", straight silicone hose adapter
- Tube # 3
- 2-1/2", 60-degree silicone hose adapter (to throttle body)

Figure 13: Tube # 1

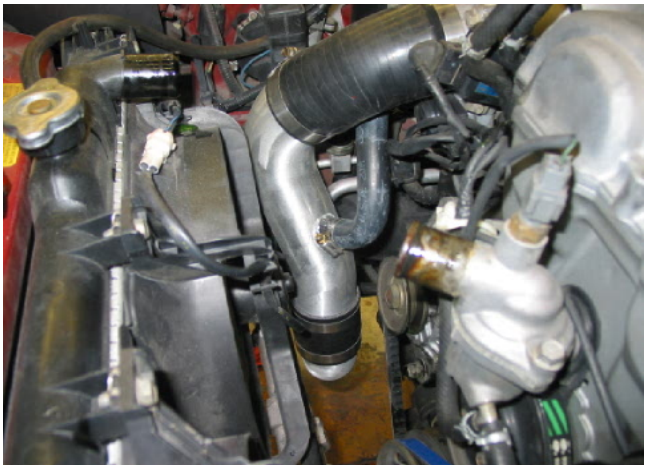


Figure 14: Tube # 2

Figure 15: IACV hose

Step 3: Connect 3/4" molded hose from intercooler pipe to throttle body's IACV (idle air control valve). (See Figure 15)

Step 4: Connect this series of hose adapters and tubes in this sequence, starting from driver-side intercooler inlet, using supplied hose clamps (See Figures 16, 17):

- 2-1/2", 45-degree silicone hose adapter (from intercooler inlet)
- Tube # 4
- 2-1/2"-to-1-3/4", straight silicone hose reducer
- Tube # 5
- 1-3/4", straight silicone hose adapter
- Tube # 6
- 2"-to-1-3/4", 110-degree silicone hose reducer (to supercharger outlet)

Figure 16: Tube # 4

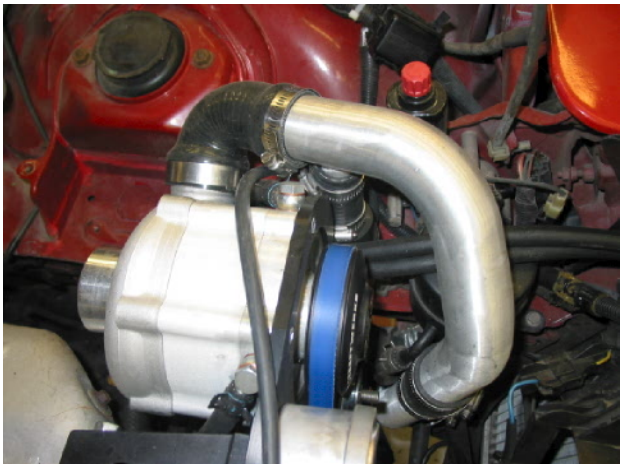


Figure 17: Tube # 6

Step 5: Install custom-molded hose onto supercharger inlet using supplied clamps (3/8" adapter facing up, 1" adapter facing down). Connect 1", 90-degree hose to custom-molded hose's lower adapter and to bypass valve outlet. Connect 1", straight hose to Tube # 6's lower adapter and to bypass vale inlet. (See Figures 18, 19)

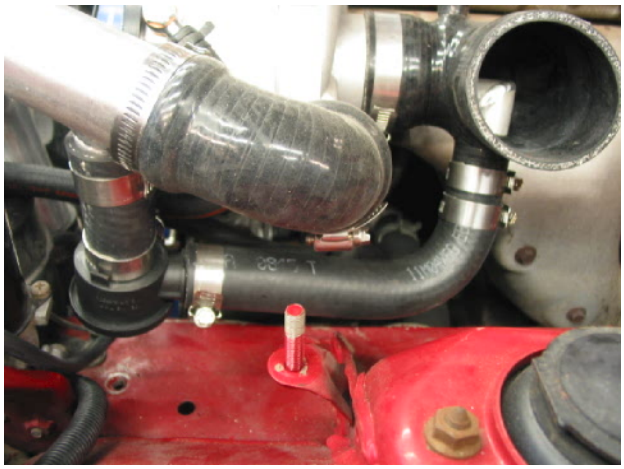


Figure 18: Bypass valve installation

Figure 19: Bypass valve orientation

Figure 20: Vacuum house routing

Step 6: Connect bypass valve vacuum port to intake manifold using supplied vacuum hose. Fasten hose to valve cover using two supplied rubber-insulated clamps. (See Figure 20)

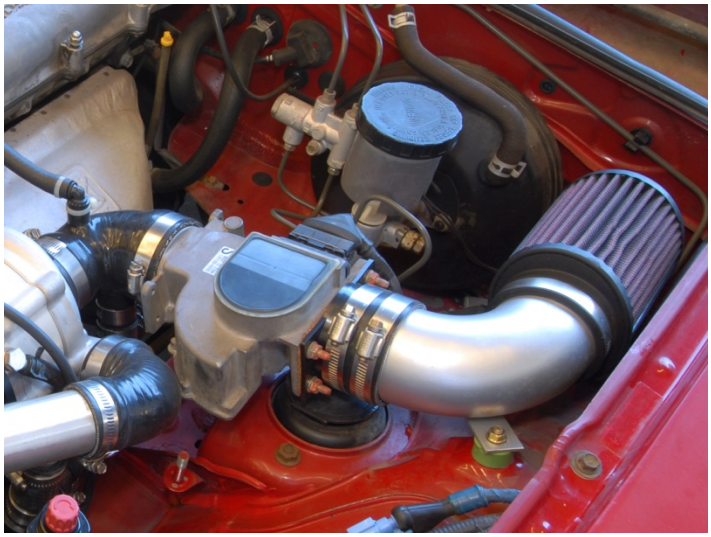


Figure 21: Intake installation

Step 7: Connect supplied rubber isolator mount (Figure 21, lower right) onto chassis and install the following components in this sequence, using supplied clamps, starting from the custom-molded hose. Align components before tightening (See Figure 21):

- MAF sensor
- MAF adapter
- 2-3/4", straight silicone hose adapter
- Tube # 7 (bolt to isolator mount)
- Air filter

Figure 22: Breather adapter and hose

Step 8: Install 3/8" elbow onto custom-molded hose's upper adapter. Connect 3/8" hose to valve cover breather. Secure with supplied zip ties. (See Figure 22)

SECTION 6: FUEL SYSTEM INSTALLATION:

Figure 23: Fuel pump comparison

Step 1: Remove fuel pump from tank. Remove fuel pump clip, O-ring, and sleeve, and install components onto supplied DeatschWerks fuel pump. (See Figure 23)

Figure 24: Fuel pump assembly

Step 2: Attach supplied filter and bottom bracket, and install in original location. (See Figure 24)

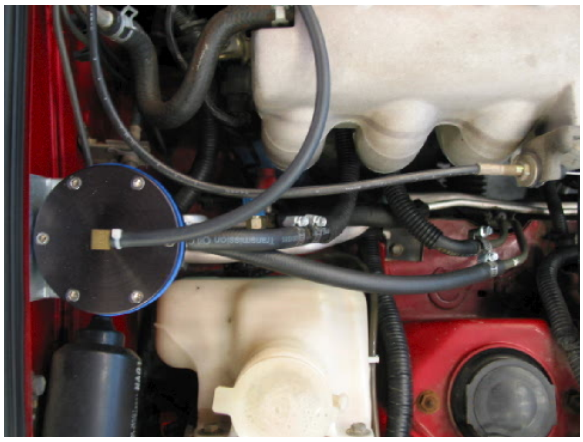


Figure 25: Fuel management unit installation

Step 3: Mount supplied fuel management unit onto firewall. (See Figure 25)

Step 4: Remove original fuel return hose that connects to factory fuel pressure regulator. Using supplied hose and clamps, connect factory fuel return hard line to fuel management unit's 90-degree, lower barb. Also using supplied hose and clamps, connect factory fuel regulator's outlet port to fuel management unit's straight, upper barb. (See Figure 25)

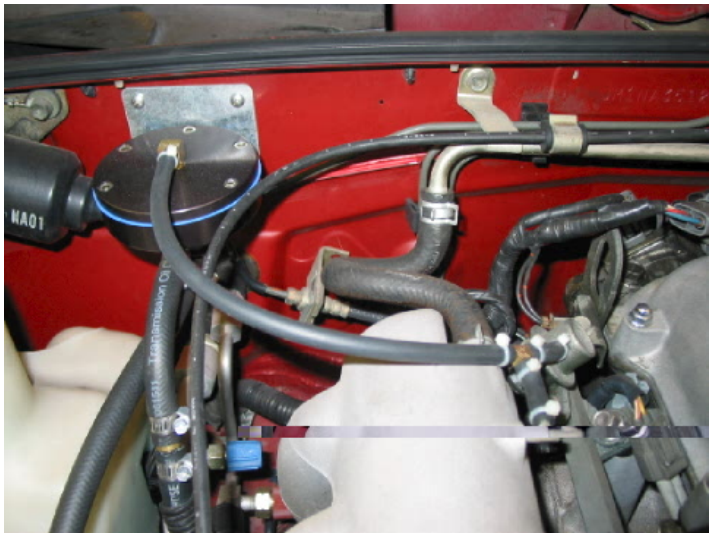


Figure 26: Fuel management unit vacuum line routing

Step 5: Connect fuel management unit's vacuum port to factory fuel pressure regulator's vacuum port and secure with supplied zip ties. (See Figure 26)

Figure 27: Fuel injector installation

Step 6: Remove intake manifold's IACV. Unbolt fuel rail and remove factory fuel injectors. **Important: Prevent debris from entering port openings.** Replace with supplied 310cc/min. Grams Performance fuel injectors and replacement clips. (See Figure 27)

SECTION 7: PRIMING THE SUPERCHARGER

Step 1: Unplug fuel injector connectors and loosen Rotrex supercharger's "OIL OUT" banjo fitting. With an assistant's help, crank engine for 10 seconds until oil begins to leak from supercharger's oil outlet. If oil doesn't leak, repeat procedure up to five times. (Allow starter ample time to cool in between tests.) If oil still doesn't leak, reconnect fuel injector connectors, start engine, and let idle for three seconds. Repeat procedure until oil begins to leak from supercharger's oil outlet. Once properly leaked, tighten supercharger's "OIL OUT" banjo fitting and restart engine. **Closely monitor Rotrex oil reservoir throughout procedure, not allowing it to run dry as oil transfers throughout system.**

Step 2: Raise engine speed to 2,000 rpm and hold for 15 seconds. Allow engine to idle and verify Rotrex oil reservoir's oil level. (Do not check Rotrex oil reservoir's oil level when cool.)

Rotrex oil reservoir's oil level should be approximately halfway between reservoir dipstick's min and max marks once oil system is level.*

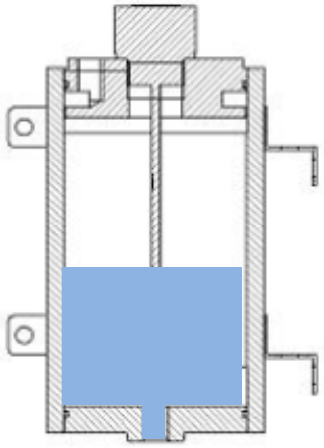


Figure 18: Proper Rotrex Oil Level

*Do not overfill Rotrex oil reservoir. If overfilled, leaking will occur at high engine speeds. The system draws oil through the Rotrex supercharger and sends it, at low pressure and low volume, to its oil cooler. It can take a significant period of time for the system to reach its "normal" operating level. Follow above instructions for best results.

Step 3: Once again, double-check all connections, hoses, intercooler piping, oil lines, and vacuum hoses. Recheck engine oil level and fill if necessary.

Enjoy your KraftWerks Supercharger System!