

ZURICH ENGINEERING, INC.  
MAZDA MIATA MX5 / MIATA / EUNOS

**SUPERCHARGER KIT PRODUCT DOCUMENTATION**

**NOTE TO VENDOR:**

THIS DOCUMENT MUST BE BROUGHT TO THE ATTENTION OF THE CONSUMER

**NOTE TO CONSUMER:**

PLEASE READ CAREFULLY

COMPLETE THE PRODUCT REGISTRATION AT THE END OF THIS BOOKLET

CHECK OUR WEBSITE FOR PRODUCTS UPDATES AND NEW INFORMATION [www.vf-engineering.com](http://www.vf-engineering.com)

### **SUPERCHARGER KIT LIMITED WARRANTY**

- 1.** The term Supercharger Kit refers to the products described under the Applications listings on the VF-Engineering website.
- 2.** The Supercharger Kit consists of the Vortech supercharger unit, brackets, hardware, ducting and ECU upgrade software.
- 3.** This warranty is provided to the original purchaser of the Supercharger Kit for the parts in the Supercharger Kit only.
- 4.** The supercharger unit terms are subject to the *Supercharger Unit Warranty*. ECU upgrade software provided by GIAC USA is subject to their terms and conditions.
- 5.** Co-existing conditions of this warranty include website terms and conditions notice
- 6.** The terms of this warranty specify that the Supercharger Kit shall remain free from material and operational defect for the period of 12 months with no limit to mileage, or 36 months with no limit to mileage (if extended warranty purchased) subject to the terms set below:
- 7.** warranty cover for the Supercharger Kit is excluded under the following conditions.

- i. You are not the original purchaser.
- ii. The supercharger must NOT be modified, disassembled, tampered in part or whole.
- iii. The supercharger drive pulley, must not be changed and the original pulley seal must remain intact.
- iv. The conversion must be allowed to 'break in' for a period of 300 miles and inspected as per maintenance instructions.
- v. The main serpentine belt must not be excessively tensioned see belt tensioning instructions.
- vi. The Supercharger Kit must be maintained according the minimum service requirements as listed under the maintenance schedule below.
- vii. Acts of God, normal wear and tear, rust damage, damage to vehicle or engine caused by backfire, engine failure, accident collision.
- viii. Improper installation, not following installation instructions provided, or installation by an unskilled person.
- ix. Over-speeding the supercharger by any method including under-drive accessory pulleys or larger crank pulley.
- x. Damage resulting from entry of foreign particles.
- xi. If the supercharged car is driven after an uncorrected fault has been detected.
- xii. Any faults/irregular noises are not advised to your vendor.

**9.** Power increases with Zurich Engineering, Inc. Supercharger Kits are based on unmodified engines and quoted from results obtained from dynamometer tests using the Dynojet 248C and no guarantee is given that every car will achieve the same results as pre-existing conditions may effect results.

**10.** All incidental and consequential damages are hereby excluded unless specified otherwise.

**11.** This warranty does not cover costs incurred for towing, car hire, labor costs for replacement, loss of use, or any other subsequent loss.

### **MAINTENANCE INSTRUCTIONS FOR THE SUPERCHARGER KIT**

Caring for your kit (mandatory procedures)

**12.** After fitting, the new supercharger kit should be allowed to bed in for a run-in period of 300 miles during which the engine should not be driven over 4500 rpm.

**13.** The Supercharger unit, should be maintained in accordance with the instructions provided under its warranty schedule.

**14.** The supercharger kit as fitted, should be routinely inspected. Items to check are

- i. Check all bolts fitted remain correctly torqued.
- ii. Correct serpentine belt tension is maintained.
- iii. Air Filter should be free from damage / blockage and replaced if necessary.
- iv. Supercharger air assistance line and oil lines must be checked for kinks and chaffing. Presence of such conditions will result in unit failure. Damaged / worn lines must be replaced.
- v. Ducting should be secure and not chaffing other components
- vi. Oil Breather ducting must be free from kinks / blocked path

**15.** In case of recurring mis-firing or detonation / pinging you should contact your vendor. By following these procedures you will ensure long term durability and reliability from your conversion.

## **MAINTENANCE OF YOUR SUPERCHARGED VEHICLE**

- 16.** Before supercharging your vehicle we recommend you service and inspect your vehicle. Ideally the fault codes should be reset. This would highlight any existing conditions that may need attention. The condition of consumables, such as oil, filters, spark plugs, HT leads, ignition coil, and air mass sensor should be inspected and replaced where needed.
- 17.** Never operate your engine at full throttle when the engine is cold. When starting the engine each day, always allow plenty of time for the oil to reach full operating temperature before driving hard. Full operating temperature is generally achieved only after the engine water temperature has reached the 'normal' indicated operating range for 2-3 minutes.
- 18.** Always use the highest grade of fuel available 92 Octane (USA), 98 octane (Europe) Super Plus Unleaded. Where possible try to use the same brand of fuel. Where possible do not use fuels sold at supermarket service stations.

We recommend using manufacturer recommended service components or taking the advice from our dealers specializing in the different makes of cars.

- 19.** Spark Plugs need to be changed at intervals of 8-10,000 miles or sooner. Eg. for Volkswagen models, in hot countries we recommend Bosch W6DTC copper electrode plugs.
- 20.** Spark plug leads (wires) must be checked for condition. When reaching the end of their life, they become hard and must be replaced as a complete set.
- 21.** Engine oil should be changed every 3-5,000 miles. We recommend OE oil. Do not mix different grades of oil qualities.

## **SUPERCHARGER UNIT LIMITED WARRANTY**

- 22.** A WARRANTY is provided to the original purchaser of the Vortech supercharger. This warranty is void if the seal on the supercharger drive pulley is tampered or the supercharger unit is modified in any form.
- 23.** Co-existing conditions of this WARRANTY include the website terms and conditions notice and the terms supercharger kit WARRANTY and the warranty conditions provided by Vortech Engineering, Inc. Vortech part number 008543.
- 25.** WARRANTY cover for the ZR01 is excluded under the following conditions:
- i. You are not the original purchaser.
  - ii. The supercharger must not be modified, disassembled, tampered in part or whole.
  - iii. The supercharger drive pulley, must not be changed and the original pulley seal must remain intact.
  - iv. The original Stamped serial number plate must not be altered, removed or defaced.
  - v. Excessive belt tension on the step pulley.
  - vi. The supercharger must be maintained according to the minimum service requirements as recommended by Vortech Engineering, Inc.
- viii. Acts of God, normal wear and tear, damage to a vehicle or engine caused by backfire, engine failure or accident collision.
- ix. Improper installation.
- x. Over-speeding the supercharger by any method including under-drive accessory pulleys.
  - xi. Damage resulting from entry of foreign particles.

**27.** All incidental and consequential damages are hereby excluded unless specified otherwise.

**28.** This WARRANTY does not cover costs incurred for towing, car hire, labor costs for replacement, loss of use, or any other subsequent loss.

The above warranty terms are subject to change without notice and the latest version can be found on [www.vf-engineering.com](http://www.vf-engineering.com)

Effective 01-01-2003

	A	B	C	D	E	F	G
1	<h1>Mazda Miata MX5 Supercharger kit</h1> <h2>1.0 PARTS LIST</h2> <h3>1.1 TUBES</h3> <p>Supercharger intake steel tube. Supercharger to throttle body steel tube.</p> <h3>1.2 BOX 1</h3> <p>V9F SQ Clockwise rotation supercharger and main bracket assembly. Stage 1 security sealed 3.0" diameter supercharger drive pulley. Stage 2 (optional) security sealed 2.6" diameter supercharger drive pulley. Main bracket with stamped stainless support bracket pre-torqued.</p> <h3>1.3 BOX 2</h3> <p>K&amp;N Induction filter.</p> <h3>1.4 BOX 3</h3> <p>Bolt on crank pulley. Crank pulley sandwich plate adapter. 4x M6x30 bolts. Tensioner arm assembly consisting of :     Idler pulley and end cap pre-torqued with flat head cap screw (20Nm).     2x M10x1.25 socket head cap screws to lock tensioner arm to main bracket.     Black end cap cover. Bag 1 consisting of :     CD ROM Instruction manual.     2x M10x30x1.25 Flange hex bolts.     Check Valve.     Air filter Pre-Filter.     Idler pulley with spacer, cap and flat head screw.     Loctite 262 thread lock.     MAF extension harness.     Stickers.</p> <h3>1.5 BAG 2</h3> <p>Bosch bypass valve kit with 2 rubber hoses and 2 hose clamps. Optional VF-Engineering Race Bypass polished valve. Vacuum line with T-fitting. (T-fitting is redundant for 99,00)</p> <h3>1.6 BAG 3</h3> <p>Oil feed line with 45 deg JIC fitting at both ends. Oil temp switch hex T-fitting . Loctite 545 pipe thread lock. Oil return line with 45 deg -8 JIC and screw hose clamp. Oil pan drill broach tool. Oil pan 3/8 pipe thread tap. Oil pan return fitting (3/8 NPT to -8).</p> <h3>1.7 BAG 4</h3> <p>2x 80-100mm hose clamps. 2x 70-90mm hose clamps. 4x 60-80mm hose clamps. 1x 3.5 x 2.0 coupler. 1x 3.0 x 2.0 coupler. 1x 2.5 x 2.5 coupler. 1x 2.5 x 2.5 90 deg coupler.</p> <h3>1.8 BAG 5</h3> <p>Stage 1 serpentine belt 6PK1105 Optional Stage serpentine belt 6PK1100 GIAC performance chip with 2 rows of ECU socketing pins.</p>					<b>Compatibility:</b> <b>Fits US models:</b> Miata 1.8 1999, 2000, 2001, 2002	
2						Left hand / Right hand drive compatible.	
3						<b>NOTE: This instruction manual is to be used in conjunction with annotated colour photos.</b>  <b>If you have any fitment issues, do not hesitate to contact us by email on <a href="mailto:technical@vf-engineering.com">technical@vf-engineering.com</a></b>	
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					TOLERANCE	REGULARLY CHECK THE WEBSITE FOR LATEST PRODUCT UPDATES AND CHANGES.	
					DRAWN	MFG ENG	
					QUAL ENG	FINISH	
	A	B	C	D	E	F	G

**2.0 Prior to fitting**

It is recommended that the engine service components are checked and cleaned/replaced and if possible the ECU error codes be checked and cleared.

Spark plug choice is very important with aftermarket forced induction systems. The US model Miata MX5 is fitted with NGK BKR5E from the factory. We suggest going 1-2 heat ranges cooler and we suggest the OE plug gap of 0.044" be reduced to 0.028". Note: suggestions are not intended as definitive and are to be taken as a guide only. We strongly recommend against Iridium and Platinum spark plugs.

Please follow the ECU modification instructions FIRST.

**3.0 Compatibility testing**

The VF-Engineering Miata MX5 supercharger kit can be successfully fitted with the following parts **without** the requirement of any modifications:

- ABS models and non ABS models
- Any exhaust header system
- Larger diameter front anti-roll (sway) bars
- RB front cross brace support (fitted with sway bar)

All testing has been carried out on Californian (USA) model Miata MX5. With California emissions standards being one of the highest degrees of testing, the CA models are fitted with 2 catalytic convertes as standard. The highest grade of gasoline available in CA is 91 octane.

**4.0 Incompatibility**

The VF-Engineering USA Miata MX5 supercharger fuelling chip will function as a bolt on modification on vehicles operating any other simultaneous form of aftermarket fuelling systems but not necessarily to our fuel management specification.

Compatibility with lightened flywheels has not been tested but may effect fuelling due to different load calculations by the fuel management systems.

Power steering / air conditioning – if you have removed either of these, it will not effect the kit but the power steering pump must remain fitted to its bracket on the engine block as the supercharger bracket fits in conjunction with it.

Under-drive pulley systems are not compatible with this kit. The use of a larger diameter crank pulley to speed up the supercharger will void the supercharger warranty. Note that overspinning is detectable by the supercharer manufacturer. If you choose to spin the supercharger at higher speeds than used in this kit, we recommend you study the supercharger specs on our website for max speeds.

These instruction were written for fitment to a stock engine.

**5.0 Socketing the ECU for Chip replacement**

**see pic <ecu-location.jpg>**

Locate ECU see image and ship to VF-Engineering or any GIAC dealer listed on for 44 pin PSOP socket soldering. Please note that a nominal fee is charged for the work carried out.

*For non-USA customers, socket fitting can be carried out by most chip tuning firms / dealers.*

Disconnect battery. Locate ECU / ECM (electronic control unit / module) under dashboard near pedal box in drivers side foot-well. The ECU is secured in a vertical position with 2x 10mm hex nuts. The upper nut is hidden behind a black plastic wiring shroud. Prize the shroud off the nut with a flat screwdriver and release the nut with a long 10mm wrench. The 2<sup>nd</sup> nut is clearly visible and simple to remove. Gently release the ECU and disconnect the 3 electrical plug connectors to it.

Mark your name on both faces of the ECU box and the plastic plug socket, pack generously with foam protection in a box and ship with US\$1000 insurance using FedEx / UPS / DHL only. The stock fuelling chip will be de-soldered, a socket fitted and the supercharger chip will be push-fitted onto the new socket. The stock chip will be provided soldered to an adapter. This can also be push-fitted back onto the new socket if you wish to revert to stock. When fitting chips note the rotation of the chip is critical. For 99-00 chip pin#1 is facing away from the ECU connector harness and 01-02 chip pin # 1 is facing towards the ECU connector harness.

Prior to fitting your kit, re-connect the socketed ECU and start your vehicle with the GIAC chip fitted. Allow the vehicle to run for 5 minutes and turn off. In case vehicle does not start, fit your stock chip module and repeat above. Report any discrepencies to your vendor or directly to VF-Engineering on [technical@vf-engineering.com](mailto:technical@vf-engineering.com)

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## **6.0 Hardware installation.**

### **6.1 Fitting crank pulley:**

**see pics <crank-pulley-var.jpg> <crank-pulley-bolton.jpg>**

You may need to work from underneath the vehicle. If so, remove the under-tray for access to the crank pulley.

Unscrew (but not completely remove) front anti-roll bar (sway bar) to give greater access to crank pulley bolts.

Remove 4 hex head screws securing the crank pulley. Do not disturb or remove factory crank pulley.

Identify crank pulley as either:

- Green / brown cast piece or
- Black stamped piece

If your vehicle is fitted with the Black stamped crank pulley, you will need to use the Crank Pulley sandwich plate adapter supplied with this kit. Place the adapter on the OE crank face by aligning the dimple and screw holes. Place the bolt-on supercharger crank pulley supplied over the adapter plate and align bolt holes. Check that the pulley fits snug else contact us.

Hand tighten all 4 screws with thread lock 262. Then tighten in the sequence (12 o'clock, 6 o'clock, 3 o'clock and 9 o'clock) to 12-17 Nm (8-12.2 ft/lbs).

If your vehicle is fitted with the Green cast crank pulley you will not need to use the adapter plate supplied in this kit and the bolt on crank pulley should be fitted directly onto the OE pulley as described in the above paragraph.

**see pic <crank-pulley-boltedup.jpg>**

Refit front anti-roll bar (sway bar) to factory torque specs and refit under-tray.

**see pic <crank-pulley-ac.jpg>**

Note: Unclip the AC line from the front panel, it runs very close to the crank pulley. If you do not unclip it and cable tie it back or flip the retaining bracket upside down and re-secure, the AC line may rub against the bolt on supercharger crank pulley and will most likely rupture.

### **6.2 Fitting oil feed hex T-fitting**

**see pic <oil-feed-T.jpg>**

Unclip the electrical connector from the oil temp sensor. Unscrew the oil temp sensor from the block. Screw in the new hex T-fitting supplied with the kit. Note the T-fitting and the block, are tapped with pipe threads and as such the Hex T fitting does not require the use of any crush washers or teflon tape. Use the Loctite 545 pipe thread supplied on the pipe thread only. Screw the hex T fitting in until it is hand tight and then tighten by 3 more complete turns. Try to align the port in the side of the fitting such that the oil temp sensor can be screwed into it, in the position shown in the pic. The hex T has a spare port machined into it, which is blocked off with a pipe thread screw. This port can be used as an alternative for the oil temp sensor if required. The hex T is machined in such a way that we cannot guarantee it locks down in the correct rotation, hence the spare port.

Screw the 45 degree fitting of the supercharger oil feed line to the top of the hex T and route the line up towards and over the intake manifold in the direction of the supercharger.

### **6.3 Fitting the oil return line.**

Over fill the engine by adding one-two liters of oil.

**see pic <oil-pilot-hole.jpg>**

Drill a 1/8 diameter hole in the oil pan in the position shown in the above pic. As the oil pours out, it will help push out any metal debris.

**see pic <oil-pilot-hole.jpg>**

Use the broach tool provided to drill the pan through the pilot hole. Do not push hard on the drill. The broach tool is a special cutter that pulls inwards and draws cut metal outwards and retains the cut out section as you pierce through the wall. Ensure that the drill bit is perpendicular to the surface of the pan to allow a straight through hole. You may need to unscrew the radiator from the frame of the car to allow you to access to drill the pan from under the car. At the same time oil will be dripping out and pushing any fine cuttings outward and help lubricate the drilling process. Take care not to drop the circular cut out section into the pan.

**see pic <oil-pan-tap.jpg>**

Use the tap to carefully cut a thread into the pan. ONLY thread the tap into the hole half the length of the tap. Note this is a tapered tap for cutting a pipe thread.

**See pic <oil-pan-fitting.jpg>**

Screw the oil pan fitting into the threaded hole and take care not to cross thread it. The fitting will only screw in about 1/2 to 2/3 of the length of its threaded section. The fitting should not screw in all the way (contrary to what is shown in the pic). A clean tight fit is important. Screw the 45 deg JIC fitting on the oil return line to the fitting in the pan and guide the oil line up towards the power steering pump. The oil line is cut to a specific length.

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<p><b><u>6.4 Remove intake system and prepare:</u></b> <b>see pic &lt;psteering-bkt-remove.jpg&gt;</b> Unplug the air temp sensor from the air box Unplug the Mass Air Flow (MAF). Disconnect the crankcase breather hose from the intake duct. Leave end connected to cam cover. Remove air box and intake duct. Unscrew the MAF sensor from the air box. Remove right side fan by unplugging it and removing 2 plastic harness clips, 2x10mm nuts and lifting upwards. Protect exposed surface of radiator with piece of cardboard. Remove plastic cowl holding 2-3 relays.</p> <p><b><u>6.5 Remove strut tower brace:</u></b> The engine upper strut tower brace drivers side bracket interferes with the supercharger intake pipe. We are in the process of designing a replacement side support which will allow you to re-fit the factory strut tower brace. Once this piece is available it will be announced on our website on the MX5 product page. This bracket will be provided at no charge.</p> <p><b><u>6.6 Bend power steering line and remove power steering (p/s) bracket:</u></b> <b>see pic &lt;psteering-bkt-remove.jpg&gt;</b> <b>see pic &lt;ps-line-modify.jpg&gt;</b> The supercharger which is mounted to its bracket, is secured to the engine at 2 points and 3rdly to the power steering pump. The following steps need to be followed. With the p/s pump still mounted to its bracket, bend the main power steering line downward by hand. This must be done with care and even pressure on the metal section of the line. This is necessary to provide clearance with the supercharger unit. When reverting to stock, this modification will not cause any interference. Loosen the 17mm nut connecting the p/s line to the pump by 1 turn. Remove bolts holding the p/s pump and loosen the pump in its bracket by tapping on it if neccessary. If the pump is stubborn and is not freed, prise it out of its bracket and use a hammer tap the steel sleeve in the p/s bracket outwards by 1-2 mm. This will allow easy re-fit of the p/s pump when tightening down with the main bracket.</p> <p>Loosen the power steering belt by releasing the lock nut and unwinding the tensioning bolt. Unhook belt from p/s pulley. Remove the tensioner mechanism from the p/s pump completely.</p> <p><b><u>6.7 Fitting main bracket:</u></b> <b>see pic &lt;bracket-bolton.jpg&gt;</b> <b>Note for convenience the supercharger has been removed from its bracket. DO NOT REMOVE THE SUPERCHARGER FROM ITS BRACKET.</b> The picture shows how the supercharger bracket bolts into place. Remove the engine hoist hook from the side of the cylinder head.</p> <p><b>Screw the idler pulley to the main bracket tip (only hole which is threaded). Tighten to 30 Nm. Use Loctite 262 supplied.</b></p> <p><b>Screw (hand tighten) the tensioner arm into the main bracket with the 2 bolts provided attached to the arm. Note the idler pulley on the tensioner arm is supplied pre-torqued.</b></p> <p><b>see pic &lt;bracket-bolton.jpg&gt;</b> Place the supercharger bracket with supercharger upto the power steering pump bracket with the p/steering pump sitting as shown in pic <b>&lt;bracket-bolton.jpg&gt;</b> The power steering line may be in the way of the supercharger unit and must be rotated back to towards the exhaust manifold. Check for interference of the p/steering line with the supercharger an if necessary remove s/c with bracket and modify p/steering line further. Once you have achieved adequate clearance hand tighten bolts in following sequence:</p> <p>a) Push original (long bolt) through p/s pulley into main bracket and through p/s pump and hand tighten nut on end. Eventually to be torqued to 37-53 Nm. b) Use 1st of 2: M10x30 bolt supplied and fit (hand tighten) through main bracket into block. Eventually to be torqued to 37-53 Nm. c) Use 2nd of 2: M10x30 bolt supplied fit (hand tighten) through p/s pulley through slot in main bracket to p/s pump. Eventually to be torqued to 37-53 Nm.</p> <p>Once the supercharger and bracket is fitting place re-use the original bolt to secure the stainless steel support bracket from the main bracket to the vacated hole in the cylinder head (old position of the engine hoist hook). Tighten to 30 Nm.</p> <p><b>Fitting the supercharger serpentine belt:</b> Fit the new serpentine belt completely over the bolt-on crank pulley ensuring it is well seated in all the grooves. Fit the belt over the pulley of the supercharger and then twist the belt under the tensioner ideler and over the passive idler.</p> <p><b>Torquing down main bracket.</b> Use stiff bar to lever between p/s and a/c pump to swing p/s pump upwards thus applying tension onto p/s belt. Simultaneously lock (a-c) to 37-53 Nm (26-37 ft/lbs). See notes below on setting the serpentine belt tension.</p> <p><b>Refit fan unit.</b></p>																	
<table><tr><td rowspan="4">THE PRODUCT AND INFORMATION SUPPLIED IS THE SOLE PROPERTY OF ZURICH ENGINEERING, INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF ZURICH ENGINEERING, INC. IS PROHIBITED.</td><td>ALWAYS DOUBLE CHECK FITMENT AND MAINTAIN PRODUCT AT REGULAR INTERVALS</td><td>CHECKED</td><td rowspan="2"><b>VF-Engineering.</b>  <a href="http://www.vf-engineering.com">www.vf-engineering.com</a>  1999-2003 MX5 SUPERCHARGER</td></tr><tr><td>TOLERANCE</td><td>REGULARLY CHECK THE WEBSITE FOR LATEST PRODUCT UPDATES AND CHANGES.</td></tr><tr><td>DRAWN</td><td>MFG ENG</td><td rowspan="2">REVISION: 24-MAY-03</td></tr><tr><td>QUAL ENG</td><td>FINISH</td></tr></table>							THE PRODUCT AND INFORMATION SUPPLIED IS THE SOLE PROPERTY OF ZURICH ENGINEERING, INC. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF ZURICH ENGINEERING, INC. IS PROHIBITED.	ALWAYS DOUBLE CHECK FITMENT AND MAINTAIN PRODUCT AT REGULAR INTERVALS	CHECKED	<b>VF-Engineering.</b>  <a href="http://www.vf-engineering.com">www.vf-engineering.com</a>  1999-2003 MX5 SUPERCHARGER	TOLERANCE	REGULARLY CHECK THE WEBSITE FOR LATEST PRODUCT UPDATES AND CHANGES.	DRAWN	MFG ENG	REVISION: 24-MAY-03	QUAL ENG	FINISH
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### 6.8 Fitting oil feed and oil return line to supercharger

See pic <oil-drain-sc.jpg>

Push fit the oil return line up onto the the drain fitting located at the bottom of the supercharger unit. Rotate and position the oil line in such a way that it does not chaffe with other moving parts and has 1/4" clearances. Then use the hose clamp provided to lock it to the fitting on the supercharger.

See pic <main-bkt-assy.jpg>

Route the oil feed line up from under the intake manifold and along the front of the engine and tighten it to special AN fitting on the supercharger oil feed port. It must be routed as shown in this pic to avoid it hitting the underhood. Ensure oil feed line is secured with cable ties and routed so it does not chafe with sharp edges or rough surfaces as engine vibration will cause long term damage to the line which may rupture and starve the supercharger.

### **6.9 Setting the correct tension on the supercharger serpentine belt :**

**see pic <tensioner-arm.jpg>**

The supercharger serpentine belt can be optimally set to a tension of 175 Lbs. You can use a belt tensioning tool available from Goodyear part number (KR11) #09002. We have found that the belt does not need to be excessively tightened to achieve maximum boost. A twist of 30 degrees in the longest run of the belt is also an adequate method of estimating belt tension. Note: over-tightening can result in excessive bearing wear on the pulleys concerned.

### 6.10 Fitting the supercharger ducts

Connect the 90 deg silicon coupler to the supercharger discharge with the hose clamps in place. The coupler will touch the cam cover and this is a characteristic of the kit. Use the 2.5 x 2 coupler on the throttle body and connect the supercharger discharge to throttle body pipe. Do not tighten the hose clamps to a final position.

See pic <main-assembly.jpg>

Connect the bypass valve assembly to the supercharger U-bend intake pipe as shown.

Fit the 3.5 x 2 silicon coupler onto the intake of the supercharger and connect the intake U-bend pipe to the supercharger. Connect the bypass valve hose to the spout on the pipe to the throttle body.

Extend the MAF harness with the one for one extension harness supplied with heat shrink butt connectors

Connect the MAF to the end of the intake pipe with the 3.0 x 2.0 coupler. Note the silicon coupler will cleanly clamp down onto the MAF despite the MAF being a smaller diameter. Note the MAF should be rotated in a position such that the flat face of the circuit box on it, is vertical. Connect the MAF plug to the MAF

Connect the air filter to the MAF. Fit the pre-filter onto the air filter and pierce a small 10 mm hole through the end cap of the prefilter and filter. Press fit the air temp sensor to through the hole ensuring a tight fit. Cable tie the MAF harness and air temp sensor harness to ensure they do not interfere with the fan blade.

### 6.11 Fitting the check valve:

see pic <check-valve.jpg>

The check valve is a white plastic one-way valve and must be fitted in the engine PCV system. Locate the vacuum line originating from the engine intake manifold (on left side of engine) and follow this hose to the Manifold Air Pressure (MAP) sensor mounted on the body of the car by passenger (USA) side strut tower. See picture. Cut hose and fit the check valve in-line. Note the arrow on the valve must point towards the flow to the intake manifold.

### 6.12 Final check before start up:

see pic <final-product.jpg>

Check that all tools have been removed from engine bay.  
Read through instructions and check off fitment of all bolts.  
Identify left over bolts and hardware as parts not needed.  
Re-connect battery and start engine.

## 7.0 RUNNING IN

Note: The new alternator belt will stretch for the first 1-200 miles. As it stretches the supercharger will not run efficiently and you will notice a small drop in power. IF you do notice a drop in power, check the tension on the main alternator belt. You should be able to twist it by 30 degrees. If it needs to be re-tensioned, use a marker and draw a small line across the joint of the tensioner arm and the main bracket. Then slightly slacken the idler tensioner arm (you do not want it to become completely loose) and twist the arm using a hex socket and apply small amount of tension on the belt whilst monitoring the how far the mark moves. Re-tighten tensioner arm to torques as described in over tighten. This process may need to be iterated.

	ALWAYS DOUBLE CHECK FITMENT AND MAINTAIN PRODUCT AT REGULAR INTERVALS	CHECKED	<b><i>VF-Engineering.</i></b>
	TOLERANCE	REGULARLY CHECK THE WEBSITE FOR LATEST PRODUCT UPDATES AND CHANGES.	
	DRAWN	MFG ENG	<a href="http://www.vf-engineering.com">www.vf-engineering.com</a>
	QUAL ENG	FINISH	1999-2003 MX5 SUPERCHARGER
			REVISION: 24-MAY-03

### **8.0 MAINTENANCE INSTRUCTIONS OF KIT**

We recommend you inspect the system every 4 weeks or 1200 miles which ever comes sooner. Keep a close check on the air filter when you perform your routine maintenance, ensure that it is clean and if necessary replace. Check the crankcase oil breather and ensure it is not kinked or damaged. Check that the ducting and intake ducting are all secure. It is recommended to loosen the intake duct from the supercharger every 3 months and visually check the inside and clean using a dry cloth to remove excess oil breathed through the system. Clean the supercharger pulley with a non-oil based agent such as Windex. Approximately every 12 months the serpentine belt should be removed and cleaned free of debris such as small rocks which may become ingrained in the grooves. Some kits utilize the Good Year "Gatorback" belts which are less prone to this than V-groove belts.

### **9.0 VEHICLE CARE INSTRUCTIONS**

You should always use the highest-grade octane of fuel available. Where possible, try to use the same fuel supplier and brand of fuel. Avoid running your vehicle "hard" when on a low level of fuel. Try to keep at least a quarter tank at all times.

Spark plugs must be changed every 5000 - 7500 miles. See notes on plug recommendation (Sec 2.0)

Spark plug leads / wires must be changed every 10-12000 miles.

Vehicles fitted with coil packs: check resistance of coils to verify they match OE spec.

Engine oil must be changed every 3,000 - 5000 miles.

We recommend the use of original equipment, available from your local dealer. We suggest semi-synthetic oil as supplied by Mazda, or something comparable.

### **10.0 CRITICAL ADVISE**

A supercharged engine should never be driven hard when the engine is cold. Hard driving a cold engine is a certain way to damage the engine and gearbox. This common sense rule applies to non-supercharged cars too. If this is ignored and engine failure occurs, upon rebuild, reason for failure can be identified.

### **11.0 PRODUCT UPDATES**

Please refer back to our website at [www.vf-engineering.com](http://www.vf-engineering.com) and look up the Products Updates section. Where applicable, our techs post information on any changes made to any of our products with a description and chronology. Products updates are performed as a means to improve our products. Update parts are not supplied for free unless they are deemed mandatory by our chief tech.

### **12.0 COMMON TRAITS**

Please refer back to our website at [www.vf-engineering.com](http://www.vf-engineering.com) and look up the page relevant to the product you have purchased. On this page you will find a Common Traits link which if applicable will take you to a page of information our techs have gathered relating to common traits and issues we have found or have been reported to us. This information is posted with the intention of bringing certain "known" issues to your attention which can help you make rapid prognoses of problems your vehicle may have.

### **13.0 DRIVING YOUR CAR WITHOUT THE MODIFIED CHIP**

The modified chip changes ignition timing and fuel delivery and other aspects of engine management. By driving your supercharged car without this chip, you run the chance of detonation and fuel starvation when driving above 4000 rpm. It is safe to move the car about, but not to drive hard above 4000 rpm or for pre-longed periods.

### **14.0 ACCESSORIES**

Boost gauges are a visual aid to keeping check that your supercharger system is performing correctly. This is easy to fit. The ideal position to measure vacuum from is a factory nib on the vacuum connection to the brake servo or with use of a vacuum T-fitting ideally 5/32 inner diameter some where close to the intake manifold supply.

Dump Valves or Blow Off Valves are NOT recommended with the use of our stage 1 or 2 kits. Stage 3 kits have not been tested. The use of such a valve in place of our bypass valve will vent "metered air" and cause short term and or long term driveability issues.

### **15.0 TERMS AND CONDITIONS**

Product Warranty, and Terms and Conditions of Sale are attached to the front of this document. Fitment of the kit implies you acknowledge to abide by these terms.

No liability is accepted for improper use or if any of our parts are modified, incorrectly fitted, or substituted.

Not all guidelines given are deemed to be definitive and only to be used as a guide.

Opinions, quoted facts and advises that are given should not be treated as definitive statement.

**NOTE: IF IN DOUBT ALWAYS REFER TO YOUR DEALER. NEVER FORCE FIT A PART**

Thank you for purchasing a VF-Engineering product.

VF-Engineering promotes safe and courteous driving at all times on public roads.

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