

The Original Roots Supercharger Project for BMW's

HMW V3 K.C. SUPERCHARGER KIT INSTALLATION GUIDE



The HMW V3 Series of supercharger kits have been in development since 2018. The V3 was originally established for the European enthusiasts and centered around one single bracket kit that would allow the use of 2 different superchargers, the short snout Eaton M90 and the M62. In 2020 HMW K.C. Designs Concepts was given the task to redesign the V3 into 2 separate kits. The new system is designed for the M5x & S5x line of BMW engines and it retains all OEM accessories such as air-conditioning, power steering, alternator and even utilizes the OEM belt drive. The M62 allows for low to moderate boost at 5-6 PSI, while the M90 can be pushed up to 9-10 PSI.

The V3 series of kits are covered by a 2-year craftmanship guaranty on all HMW manufactured parts.

This guide covers the installation as a whole and we offer our extended customer service to all clients through email or phone. The user is strongly recommended to have a custom dyno tune, utilizing either their stock ECU or an aftermarket Piggyback or Standalone ECU, so the system can perform at its optimal range of power.

Disclaimer: If you intend to use or install this setup please use all safety precautions & check with your local laws and regulations. We take no liability for unforeseen issues such as but not limited to the damage of your or anyone else's health and property or unlawful acts committed from application, usage or production of our products in both private or public domain. We make clear that we are not affiliated with BMW, Eaton, Mercedes-Benz, Jaguar or any other name or brand. All mentioned products & logos are registered trademarks & property of their official owners. In addition to the aforementioned disclaimer, by using any Hyde Motor Works parts and services or knowledge gained through reading this guide, you also agree to our terms of use and policies which can be found on our website.

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 revision 1.1 by Agathe on February 16, 2021

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What is included in the V3 Kit?

Below is a list of parts giving the user a basic idea and understanding of what main components are included in an HMW V3.2 and V3.62 type kit. Please note, there could be smaller parts which are not shown or mentioned, along with improvements we make throughout every revision of the kit and extra parts that may be included or even some parts removed. Kindly note, the HMW Straight Six Manifold (3) is only required with the V3.2 Eaton M90 based supercharger kit. It is only included when ordered, just like the Intercooler or the Silicone Hose kits, which are also separate orders and not included by default.

V3.2 (M90) Kit: Included Parts

Part #	Name & Description	Included with
1	Main Bracket – Bolts the M90 Supercharger, attaches to part 2, 4/5, 6, 7 & 14	All V3.2 Kits
2	Main Front Bracket– Bolts to the Main Bracket (1) using Front Joiner L Bracket (6)	All V3.2 Kits
3	HMW SS Manifold – Replaces stock engine manifold, custom variations for S50, S54 engines	If Ordered
4	M52/M54 PS Pump Bracket – Attaches to V3 Main Front Bracket (2), Replaces OE PS Bracket	All V3.2 Kits
5	M50, S50 PS Pump Bracket – Attaches to V3 Main Front Bracket (2), Replaces OE PS Bracket	All V3.2 Kits
6	Front Joiner L Bracket – Bolts to V3 Main Front Bracket (2) & Main Bracket (1)	All V3.2 Kits
7	Rear Support Bracket – Bolts to Rear of Main Bracket (1) using Rear Bracket L Mounts (13)	All V3.2 Kits
8	Manifold 1 (M90 Outlet) – Bolts to boost outlet of Supercharger	All V3.2 Kits
9	Manifold 2 (M90 Inlet) – Bolts to inlet of Supercharger using Manifold 3 (10)	All V3.2 Kits
10	Manifold 3 (M90 Inlet Adapter) – Sits between Supercharger inlet and Manifold 2(9)	All V3.2 Kits
11	Nuts Bolts & Washers – Various Sizes for bolting the entire kit. See Nuts & Bolts Guide.	All V3.2 Kits
12	M5X Throttle body Replacement Dummy 1 - Allows Relocation of Throttle Body	All V3.2 Kits
13	Rear Bracket L mount used to mount Rear Support Bracket (7) to Engine & Main Bracket (1)	All V3.2 Kits
14	V3.2 Spacers Set 1 – 4x 40 mm for installing the Supercharger at a raised height on the Main	All V3.2 Kits
	Bracket (1)	
15	V3.2 Spacers Set 2 – For 3x Idler Pulleys (15 mm each) or 5 mm x 9 pcs, 10 mm ID 24 mm OD	All V3.2 Kits
16	V3.2 Spacers Set 3 – For M50 or S50 PS Pump 2 pcs (25 mm or 21 mm each) 8 mm ID 20 mm OD	All V3.2 Kits
17	V3.2 Idler Pulleys (3 pieces)	All V3.2 Kits
18	Drive Belt for V3.2 M90 – 6PK1981	All V3.2 Kits

Bolts Guide - V3.2 (M90)

Part Name	Description	Quantity
Upper Alternator Bolt	M10 x 150 mm bolt	1
For Idler Pulleys	M10 x 50 mm bolts, nuts and washers	2
Joiner L Bracket to Front and Main Bracket	M8 x 20 mm bolts	6
Rear Mounting Bracket	M8 x 25 mm bolts, nuts and washers	3
Supercharger to Main Bracket	M8 x 100 mm	4
SC Intake and Outlet	M8 x 20 mm	8
Front Mounting Bracket & PS Bolts.	M8 x 80 mm bolts, nuts and washers	6

V3.62 (M62) Kit: Included Parts

Part #	Name & Description	Included with
1	Main Front Bracket – bolts on to the Alternator using spacers	All V3.62 Kits
2	Rear Support Bracket - bolts on to lower Alternator Bolt	All V3.62 Kits
3	Manifold 1 (M62 Outlet) – bolts on to Boost Outlet of Supercharger	All V3.62 Kits
4	Manifold 2 (M62 Inlet) – bolts on to Inlet of Supercharger using Manifold 3 (part # 5)	All V3.62 Kits
5	Manifold 3 (M62 Inlet Adapter) – Sits between Supercharger Inlet and Manifold 2 (part # 4)	All V3.62 Kits
6	Nuts, Bolts & Washers – Various Sizes for bolting the entire kit. See Nuts & Bolts Guide	All V3.62 Kits
7	M5X Throttle body Replacement Dummy 1 - Allows Relocation of Throttle Body	All V3.62 Kits
8	M5X Throttle body Replacement Dummy 2 - Allows Relocation of Throttle Body	All V3.62 Kits
9	Spacer (1) – 1 x 23 mm Spacer sits between the front main Bracket (part #1) & lower Alternator	All V3.62 Kits
	Bolt Hole	
10	Spacers (2) – 2x 25 mm (8.2 mm ID) for mounting Supercharger to main Front Bracket (part # 1)	All V3.62 Kits
11	Spacers (3) – 3x 5 mm, 1 spacer sits between the main Bracket (part # 1) and top alternator	All V3.62 Kits
	bolt, while 2 are used for sitting inside the 2 idler pulleys	
12	Spacers (4) – 2x 8 mm, used to space the Idler Pulleys (part # 13)	All V3.62 Kits
13	Idler Pulleys (2 pieces)	All V3.62 Kits
14	Drive Belt for V3.62 M62 - 6PK2145	All V3.62 Kits

Bolts Guide - V3.62 (M62)

Part Name	Description	Quantity
Upper Alternator Bolt	M10 x 30 mm bolt, washer	1
For Idler Pulleys	M10 x 180 mm bolt, nut, washer	1
Joiner L Bracket to Front and Main Bracket	M10 x 150 mm bolt, washer	1
Rear Mounting Bracket	M8 x 115 mm bolts, nuts, washers	2
Supercharger to Main Bracket	M8 x 90 mm bolt, nut, washers	1
SC Intake and Outlet	M8 x 20 mm	8
Front Mounting Bracket & PS Bolts	M8 x 80 mm bolts nuts and washers	6

Piping & Coupler Guide

Please find below a list of pipes and couplers that you can purchase as the V3 Silicone Hose kit. If you wish to intercool it, then this would change and the length of each of piping will depend on your own needs, the type of intercooler and where it is mounted.

On some chassis and engine combinations you may require more piping than we supply. The E30, E36 and E46 are all quite a bit different, while the 5 Series, 7 Series, Z3 and Z4 are in a category of their own.

Below we also describe in a short summery how the piping is done, using the kit on an E36. A detailed guide with pictures is presented in the installation section.

- 1x Straight Silicone Coupler (2.5"/63 mm ID), to join the rear inlet of the M90 & M62 to the throttle body relocation adapter.
- 1x 90 Degree Cast Elbow (3"/76 mm ID), to join the OEM Intake Boot to Silicone Reducers that attach to the MAF sensor.
- 2x Straight Silicone Reducer Coupler (80 mm 76 mm or 80 mm 63 mm ID) for attaching the MAF Sensor and housing to the intake.
- 2x 90 Degree Silicone Elbows (63 mm ID) for piping the outlet of the Supercharger to the engine manifold or an intercooler.
- 1x Straight Aluminum Coupler Joiner (63 mm OD) to join the 2x 90 Degree Silicone elbows together to find the correct angle required to reach your engine manifold.
- Hose Clamps 14 Pcs.

For a detailed image depiction of how the piping is meant to be done on the V3 series kits, please see the basic piping guide on page 21.



Pulley Options

A rule of thumb on superchargers: the smaller the pulley, the faster you spin the rotors and the more power you output. With the stock supercharger pulley your boost will be limited and you will have to upgrade to an aftermarket or custom pulley for more boost. This method will become inefficient in its own right after a certain point, due to the size of the supercharger. From the Eaton M62, with its stock displacement of 1000 cc, you should not expect to push more than 6 PSI safely with an intercooler. While on the Eaton M90, with its 1500 cc displacement, you can push it upwards of 8-10 PSI.

Custom Pulleys: If the engine is built you can upgrade the stock supercharger pulley to a variety of custom aftermarket pullies or a custom machined one that can replace the one already there. Typically, the aftermarket pullies come with instructions that are also available online, they could also require a special pulley removal tool to be used to remove and install the new one.

Note: Adding an air to air intercooler usually will result in a boost drop of 2-3 PSI.

Preventive Maintenance

As a preventive maintenance, the bare minimal you should do is to replace all the potentially leaky gaskets in your car, such as the valve cover gasket with fresh O-rings, oil pan gasket, oil level dipstick O-rings, oil filter housing (if leaky or warped) etc. Minimum injector size of 30 - 36ibs is recommended for most optimal operation. You may want to upgrade your MAF sensor as well. Clean the ICV, use new spark plugs, and finally replace your fuel filter. Cam and crankshaft-position-sensors should be replaced with OE Genuine or OEM Brand if they are still the original ones that came with the car. This is not always required but you would hate to be stuck in traffic or at the side of the road, unable to start up which is the case if these two sensors fail. Sometimes even the o2 sensors can fail from running the car too rich after the SC is installed, till your tune is resolved. But we are not suggesting to go and replace all sensors in a bid to prevent what may go wrong, but we are giving you an overview of things that tend to go wrong and to consider them later down the line.

Another part that is essential is the old factory belt tensioner, this should be replaced with a new one. It is an easy replacement that requires minimal effort. Otherwise it can be a reason for belt <u>slippage and boost loss</u>. It is recommended to use the <u>mechanical spring-loaded tensioner</u>. This may also be a time to check if you have the <u>extra pulley on your alternator</u> and if you don't, add it. Some cars came with it and some without.

Please ensure your car is 100% healthy before you even begin installation. Start with a good engine and chassis, ensure all common seals, gaskets vice versa have been replaced or at least aren't leaking and that the car runs well with no vacuum leaks, engine or transmission issues. A party Smoke & Fog machine from online stores can help detect typical vacuum leaks. Also, plugging in a code reader to read any codes, should there be any before installation, is a good idea. Alternatively, just setting up INPA on an old laptop with some proper FTDI chipped USB or ADS serial cables is also a great step in self-diagnosis of your car for any future error code diagnosis. When satisfied and ready to commence, unplug the car's battery and put it on a tickle charger, since the installation can take days.

Pre-Installation: Chapter 1

Before going into installation however, we would like to make some more suggestions, as making room as well as some required & recommended modifications that will help with the installation and get the most out of your setup. They are as follows:

Positive Crankcase Ventilation (PCV/CCV) Delete

The factory CCV/PCV system found in newer OBD II cars such as the 323i/328i/528i/523i etc, often fails. Many people prefer to delete this system. If you are running any kind of boost then **it is required** to not have the crank case cover vent line connected to it, such as the BMW CCV filter, since this will no longer work as intended. With added positive pressure (boost) not only the crank case ventilation will be blocked but also the crank case itself will be pressurized. The engine will no longer be able to vent the crank case fumes. This results in all kinds of problems and damages in the long term, along with e.g. leaks from the valve cover or engine oil pan. If running the HMW Straight Six Manifold with the V3.2 (Eaton M90 based kit), you can simply exclude the CCV system. If using the V3.6 (Eaton M62 based kit), then you will be using the stock intake manifold and as such delete the CCV system. Ensure the engine is able to vent any crank case fumes and pressure and plug the dipstick return tube (OBD II typically), if your car has one. On the internet there are plenty of videos and guides on "PCV Delete" which you can use as a resource. It is a simple job but most critical for any kind of forced induction system on these motors. Failing to do this can cause severe engine failure.

Crankcase Venting

As for venting the crankcase, consult your local laws and regulations for emissions and such. Traditionally it has been vented to the atmosphere, alternatively you can have the line connecting to the intake of the supercharger and remembering to block the line coming out of the dipstick. You can also add an oil catch can. The crank case cover vent line goes into one barb while you can either have a line coming from the oil dipstick or the intake into the other barb. This will however require you to drain the catch can every few months. The other method to avoid having to drain the catch can is to modify the oil catch can, and introduce a hole on the bottom. Add a barb fitting that connects it to the oil dipstick, using a silicone oil resistant hose. The top simply has a tiny filter to vent out the fumes, therefore eliminating the need to vent. Advanced users may try to use a venturi system or read up on it.

IAT Sensor

You will retain your original Idle Air Temp (IAT) sensor. Don't mix an OBD I sensor with an OBD II since it won't work, e.g. the M50 motor will use the sensor it came with while an M52/M54 will use the OBD II type it came with. You should place the sensor in the manifold by threading the sensor itself with a 'tap and die'. Thread the right sized hole in the manifold. This will allow it to detect the correct charge air temperatures after the air has passed through the intercooler. If you are using a custom ECU management system, then please consult the manufacturer or tuners instructions.

Idler Pulley

We provide the correct idler pulleys with the kit. The idler pulley is necessary to apply more tension and wrap to the belt. These pullies simply bolt on after you have installed the brackets. Alternatively, BMW part number 11281748131 pulley is to be used.

Power Steering

The M50 engines use the LUK 32411137952KT power steering pump. The V3.62 utilizes our latest alternator mount brackets, while the V3.2 brackets still use the legacy system. The V3.2 can be fitted to the M50/S50 engines, utilizing additional spacers to space out and re-use the M50 power steering pump and oil filter housing. An HMW M50 bracket (sold separately) can also be purchased. More details on the respective section of this guide.

Where possible, we recommend to use the LF30 pump, which fits in an M52/M54 oil filter housing. Also note, certain M54s have the LF20 power steering pump that can be swapped with the LF30 pump. The downside of having the LF20 and more so, the LUK 32411137952KT, is that they are prone to brakeage. Also due to the cast housing, it may require some trimming of the bracket / housing on its side to get it to fit properly.

LF-20 (W01331598589LUK) – On M54 Engines

LF-30 (W01331662628LUK) - On M52 Engines



Radiator Hose

You may require to modify or replace your existing factory or aftermarket radiator hose. We offer the HMW 40 mm top radiator hose adapter that can be used to modify your existing hose. This also allows for a water temperature probe sensor. 5 & 7 Series users may need the bottom coolant reservoir line modified as well.



Pre-Installation: Chapter 2

Before we can begin with the installation of the HMW V3 kit, we must start by removing some components to make room for the new kit. While most of this is straight forward, it can be overwhelming for a beginner. The V3.2 kit also involves removing your fuel rail and injectors to use the HMW Straight Six Manifold. Since there is also a fire hazard, kindly use all safety precautions before proceeding!

Since this guide is centered on the installation aspect of our kit itself, we will cover the basics of the removal of the required components below. Rest assured there is nothing too complicated involved and at any time you have doubts or questions, simply contact us. Alternatively, just use your shop manual, if you have one, or a quick search on the internet will bring out many DIY guides & videos. You may also use our recommended resource, which is *Pelican Parts & 101 Projects*, an entire series for these cars.

You should also take pictures and label things for convenience so that you don't lose anything and know how to put it all back together. Below are some quick notes:

Intake Piping, Stock Airbox & MAF Sensor - from the throttle body. They are connected using hose clamps. The airbox is usually held on by two bolts and some clips. Remove the MAF sensor and store it in a secure place. Remember its orientation when reinstalling, the arrow points towards the airflow direction, which is going to the engine.

Intake Manifold, Fuel Rail, Injectors – (required only for the V3.2 M90 kit) removal of the intake manifold requires you to remove all the associated pipe work mentioned earlier and more, such as the ICV and the throttle body. The fuel rail must also be removed which will grant you access to the bolts on top as well as the bolts on the bottom to the two brackets that hold the manifold in place.

The Bumper – remove the bumper trims. Now you will have 4x 13 mm nuts. Look under the front wheel wells, assuming your wheel well liner plastics are still in one piece. You will see a screw on each side that holds the bumper. Now double check for any other screws or bolts underneath. You should be able to just slide the bumper off forward, but be careful as you have to disconnect the 2 fog light connectors as well as the 2 temp sensors on each air duct, so it helps to have the car jacked up.

Top Radiator Hose – once the car has sat and cooled down, you can remove the top (hot) radiator hose. Prepare for some spillage and mop as needed. **Be sure to refill and bleed the cooling system** once you are done installing the radiator back at the final stages. If you don't bleed the system properly you will leave many air pockets which will end up causing your engine to overheat. Use the proper coolant premix. For testing purposes, we use pure distilled water in our builds.

Power Steering Reservoir - it's held on by 2 bolts to the engine mount or the oil filter. This is dependent on the model of car and engine. On some models the engine support arms have a spot to bolt it on. Simply relocate the reservoir as needed.

Power Steering Pump Pulley – (required only for the V3.2 M90 kit) there are 3 bolts holding it in place. Jamming a screw driver in the belt can help locking it or having a friend give you a hand while you undo them. Be careful not to break it. There are metal ones available.

AC & Serpentine Belt – take out the power steering pulley bolts before you remove the belt. First take out the power steering belt and then the AC one. It has got a hydraulic tensioner with a locking mechanism where you can use alien keys to lock them in, if you are missing the locking tools.

Power Steering Pump & Bracket – (required only for the V3.2 M90 kit) this is the final part. There are 5 bolts in total and this is what our main front bracket will replace. Keep a track of the bolts, sizes vary. Once it is out, use cable/zip ties to secure the pump so that all the weight or pressure is not on the hoses. Now may also be a good time to replace any leaky hoses!



pic 1: First picture shows how it looks, once you have removed the stock engine intake manifold and associated parts. This is what the engine compartment should look like before installing the V3.2 M90 based supercharger kit. The V3.62 M62 does not require the removal of the engine intake manifold, the fuel rail may only be removed to upgrade the injectors to larger



around any exposed cables.

ones.

pic 2: Once the engine manifold is removed, cover up your intake ports with some tape to ensure nothing accidentally falls inside as you work on it.

pic 2.A: The plastic cover part of the injector harness cover has to be often removed for the M1 custom Straight Six intake Manifold. Simply remove the cover which is held in place by plastic tabs and use electrical tape or tubing to wrap





pics 3, 3A: Use a longer hose on the idle control valve. It will go up and connect to the large port on the rear side of the supercharger. The inlet hose on the bottom of the idle control valve will have to be extended up to the throttle body. That will be connected to the air intake between the MAF and throttle body.



pic 4: On the E36 - if you have the early generation ABS brake unit, you can add two 90-degree PVC elbows to the side of the E46 reservoir. Drill and tap these and screw in the fittings. For a little extra insurance, you can also add some plastic epoxy.

Note: Required only for the V3.2 M90 kit.

Power Steering Pumps

pic 5: The power steering pump bracket will need to be replaced with the bracket supplied in the kit. There are 2 different



types of power steering pump brackets that are supplied in the kit. On the left, you will find the traditional OBD I power steering pump bracket suitable for M50, S50 motors. And on the right, there is the OBD II (M52/M54/S52/S54)

type power steering pump bracket. Depending on your engine and power steering pump, you will have to use one or the other. On the M52 or M54 don't use any spacers between the power steering pump bracket and the main front bracket to space the power steering. Simply bolt on the power steering bracket on top of the main front bracket.

OBD I (M50, S50, S52)

pics 5A, 5B: This is for the older style M50, with the cast aluminum LUK 32411137952KT type power steering pump



bracket. For the newer LF30 type, please see below. Note, that the OBD I *LUK* 32411137952KT power steering pump can easily be upgraded to the LF30.

pics 5C, 5D: The four bolts, that hold the bracket to the pump are also the same bolts that hold the pump together. You will have to keep the pump together while you remove all four bolts.

Tip: We recommend to secure a large Cclamp into a bench vice. Place the power steering pump in the C-clamp. This way you

can apply some pressure to the front hub of the power steering pump and the rear housing. Tighten the C-clamp down, just a little bit more than when it touches. You shouldn't force the pump together, just hold it, so it doesn't come apart. There is a pressure regulator valve and spring in the rear of the pump, that will try to push it apart.

Side note: if your pump is leaking, we recommend to take the pump apart and replace the seal.

With the pump secure, remove all four bolts and allow the original power steering bracket to slip away onto the C-clamp and away from the pump hosing. Use 2 shorter bolts and nuts and place them diagonally on the pump housing, to hold it together.

Note: Required only for the V3.2 M90 kit.

pics 5E, 5F: Remove the pump from the C-clamp and take the aluminium bracket off. Put



the HMW bracket on the C-clamp and reinstall the pump. Same as before, but just a little bit of pressure on the pump with the C-clamp, so that you can remove the two bolts.

Then slip the HMW power steering pump bracket up into place and install the 8 mm bolts supplied in the kit.

The two 80 mm bolts are for the short side, without the rear bracket. Use the two 100 mm bolts on the other side of the pump and then reinstall the spacers and rear



side of the pump and then reinstall the spacers and rear support bracket, that was on the pump originally and attaches to the oil pan. Once all four

bolt nuts and washers are installed and tightened, you can remove the pump from the Cclamp and it is ready to be reinstalled in the car. Note, on the S52 US engine you may have

to drill out the holes slightly to what is in the bracket already.



OBD II (M52, M54, S54)

pic 6: For those with the M52/M54 engine type, use this type 2 power steering bracket mounting on the power steering pump.

Remove the three torque head bolts that secure the original power steering pump bracket. Replace it with the type 2 power steering pump bracket.

pics 7, 7B: These brackets may need to be cut off to clear the V3 Top

mount bracket. The engine manifold support brackets also need to be unbolted and removed.



PICTURE



pic 7A: The power steering reservoir needs to be relocated. Depending on how you are running your charge pipe, you may have to modify the power steering pressure hose.

Note: Required only for the V3.2 M90 kit.

V3.2 Eaton M90 Installation



pics 8, 6A: Remove upper alternator bolt with idler pulley. Install two M10 x 50 mm bolts into the front mounting bracket. These will be used to mount idler pulleys later on.

pics 9, 9A, 9B: Then, using the two M8 X 80 mm bolts and washers mount the power steering bracket onto the front mounting bracket.

The bolts will go through the power steering bracket, into the two lower holes of the front mounting



shipped with a redesigned M50 PS bracket) one on each bolt and mount to the oil filter housing where the factory original power steering bracket mounts. Do not tighten just yet.



Note: On the OBDII M52, M54, S54 engines, no spacing is required between the front main bracket and the oil filter housing. To fit this on the S50 Engine, the power steering pump may require to be spaced further back.



pics 9C, 9D: Next, if you have the OBD I power steering, and your oil pan allows, we suggest you install one M8 X 20 mm bolt with a washer to join the rear P.S. bracket to the female threaded location in the oil pan as shown.

Now use the M10 x 150 mm bolt with a washer and a 16 mm spacer to install an idler pulley from the kit

to the upper part of the front mounting bracket, which replaces the original top alternator bolt and/or pulley. This new pulley requires 16 mm spacing between the front mounting bracket and its base. Therefore, use 3 pcs of the 5 mm spacers we provide plus a single 1 mm washer in between. Once this is done, you can tighten the two lower power steering bolts and the upper alternator bolt.



pics 10, 10A, 10B: Next install the two idler pulleys using 16 mm spacers onto each of the bolts, then idler pulleys, and then then a single washer and nut for each pulley.



Install the power steering pulley. Now, using 8 mm bolts from the kit, install the angle bracket to the front mount bracket and then you can bolt on the top supercharger mount bracket to front mounting bracket.



pics 11, 11A, 11B: Next, remove the left side motor mount nut. Using the small L brackets attached to the rear support bracket, install the rear support bracket onto the motor mount stud and then reinstall motor mount nut.





To now attach the upper rear support to the rear of the supercharger main top mounting plate, use a M8 X 20 mm bolt with nut and washer.

pics 12, 12A: Finally, once the above steps are complete you will be ready to mount the supercharger to the top main bracket.



To do that, you will need the four M8 X 100 mm bolts, nuts, washers and four 40 mm spacers, one each between every single mounting point (leg) of the supercharger and the top supercharger mounting plate. The kit will typically come with 10 mm or 5 mm spacers, so use either four or eight pieces of the spacers on top of each other to add up to the height of 40 mm.

Put all four bolts through the upper supercharger mounting tabs, through the spacers, and into the slot in the top mounting bracket. Place washers and nuts on the bottom. Do not tighten just yet, you may have to move the supercharger forward or back a little to get correct belt alignment.

Now you should add the two inlet and outlet manifolds for the supercharger included with the kit. Ensure to use proper rubber or cork gaskets between all mating surfaces, alternatively using silicone gasket maker is also an option.

To attach the rear inlet and top outlet ports of the supercharger to the provided manifolds of the kit, you will need to use a total of eight M8 X 20 mm bolts: four bolts for attaching the rear inlet manifold of the supercharger, and four for the top outlet discharge manifold. Note: On some models you may require an included adapter plate that sits between the rear inlet of the supercharger and the rear inlet manifold.



Next install the new intake manifold, the opposite of how you remove the original. The HMW Straight Six intake Manifold has additional ports for IAT sensor, boost gage, raised rate FPR, and ECU map sensor. Plug the ones you do not need.

pic 13: You will have to drill and tap the bottom of the intake plenum for the intake air temp sensor, and fittings for vacuum boost hoses that you may need for things such as a boost gauge, rising rate fuel pressure regulator, stock fuel pressure regulator, stand-alone ECU map



sensor or anything else that needs to have a boost and/or vacuum reference. This would have to be done before the intake is installed.



pic 13A: Install new intake gaskets on to the intake flange. You can use a little dab of high temperature red silicone to make sure the gasket seals.



pic 13B: Thoroughly clean around each intake port. We recommend 3M scrub pad and brake cleaner. You don't want to remove any aluminium from the cylinder head, that will cause the intake gasket to not seal properly. Ensure nothing has gone inside the ports, which should be the case if you have taped the ports while you worked.



pics 13C, 13D: Use a little dish detergent on the O-ring seals of your injectors. Install them into the fuel rail, securing them with the retaining clips. Then install the fuel rail and injectors into the intake manifold. You may have to enlarge the bolt holes in the fuel rail to accept the 8 mm bolt for the intake manifold.

Note, if you are using aftermarket fuel injectors that have a much larger body, you may have to open up the top portion of the injector bungs in the intake manifold.

Also, if you are using the kit on an M54 engine, then kindly ensure you have the HMW M54 adapter plate for the manifold.

Now, connect fuel lines and injector harness to injectors. Connect the intake air temp sensor, and all vacuum lines.

Note: Required only for the V3.2 M90 kit. You don't need an HMW Straight Six intake Manifold if you are using the V3.62 Kit that is for the Eaton M62 and designed to fit under the stock intake manifolds.

pics 14, 14A, 14B: Next, install the belt and check the alignment of the pulleys. The correct belt size is 6PK1981 for the V3.2 M90 kit. We suggest using a straight edge between the crank, alternator, water pump pulleys and their ribs as well as the pulley and ribs of the supercharger. If everything looks accurate and good, then you can



tighten the four bolts on the supercharger.

Once the supercharger, manifold and all bracketry have been installed, you can use the dummy M5x throttle body provided in the V3 kit to relocate the factory original throttle body in your car.

Place the factory throttle body on to the other throttle body dummy mount and drill the holes to match the bolts you are using if required, then you can mount the throttle body to the adapter. From there you can use silicone coupler with clamps to attach the throttle body to the rear inlet of the supercharger.

You will have to connect your air filter and MAF (Mass Airflow Sensor). The MAF sensor must be placed between the air filter and the throttle body. Piping to this would be vehicle-specific. The factory 90-degree elbow from the M50, M52, M54 engines (without the secondary traction control throttle body) works very well as it has already a placement for the ICV connection and adding another 90-degree elbow, then piping it under the alternator towards the front of the car. You will find a simple diagram on page 22 to give you an idea of how it is meant to be connected if you are using the HMW silicone hose kit, which is only for non-intercooled setups.

V3 Eaton M90 installation ends here.

V3 Eaton M62 Installation

The HMW V3.62 is a very basic and simple to install kit for the BMW M5x and S5x engines. This kit retains the original factory intake manifold for the engine. As such, this installation in particular does not require the removal or replacement of the original intake manifold or the power steering. You will find quite some steps above that may however overlap from the V3.2 kit.

To begin with all as above, such as the airbox, throttle body, and factory intake piping, ICV, PCV, drive belt, fan delete, top radiator hose, relative sensors, power steering reservoir, charcoal cannister and all such will need to be removed. The factory manifold can stay.



pic 1: Remove the upper and lower alternator bolt. Do not remove the alternator, as you will shortly install the main front bracket, utilizing these two alternators mounting bolt holes with longer bolts, which are provided in this kit. On some cars the upper alternator bolt will also have a factory offset idler pulley. Regardless if your car has it or not, you will need to install an idler pulley provided in the kit onto there. This is required for proper belt alignment and wrap.



pics 2, 2A, 2B, 2C: Now, to install the main front bracket onto the alternator you must use the correct spacer and length bolts. Start by putting the bracket over the front of the alternator and align the bolt holes. Begin with the lower alternator mounting bolt by using one single M10 x 180 mm bolt with a washer, along with a 23 mm spacer behind the bracket, so the bracket sits on the spacer and the spacer sits on the alternator, as the bolt goes through to replace the lower alternator bolt. The 23 mm spacer will need to sit between the front main supercharger mounting bracket and the lower bolt hole of the alternator itself. Do not tighten the lower alternator bolt yet as it will be used to mount the rear support bracket.



For the top alternator bolt, you will also need one regular 70 mm INA idler pulley provided in the kit, along with one M10 X 150 mm bolt, two 5 mm spacers and one 8 mm spacer. The 8 mm spacer goes between the INA idler pulley and front main mounting bracket. One 5 mm spacer sits between the front main mounting bracket and upper alternator bolt hole, while the second 5 mm spacer goes inside the idler pulley itself.





pic 3: Next you must install the rear support bracket to the lower 180 mm alternator bolt which should be now sticking out of the rear of the lower alternator. You should use a washer on each side to sandwich the bracket, and then install a nut and hand-tighten it. The rear support bracket on some earlier revisions of the M62 kit may be slotted for adjustment that Is needed for some variations in these superchargers.



nuts.

pics 4, 4A: Once the front main bracket & rear support bracket have been bolted on, the supercharger can now be installed. You will need two 25 mm spacers with two M8 X 115 mm bolts with nuts and washers for mounting the two front mount points of the supercharger to the front main bracket. The spacers go between the supercharger mounting ears and the mounting bracket. Install the 115 mm bolts with washers and

pic 5: For the rear support bracket you require one M8 X 90 mm bolt with nut and washer that attaches the rear support bracket to the rear of the supercharger, closest to the intake manifold.

Once all this is installed, you can tighten the upper alternator bolt for the rear support brackets mounting point that was previously hand tightened. Now, you should tighten the two front and one rear supercharger mounting bolts. Once the supercharger is level, tighten the lower alternator bolt and nut. Ensure to check with a straight edge to ensure proper belt alignment.



Now would be an appropriate time to mount the supercharger inlet and outlet. Use gaskets or gasket material to seal all mating surfaces. For the rear inlet of the supercharger, you will need the four M8 X 20 mm bolts to attach the adapter plate and inlet flange to the rear of the supercharger. The adapter plate merely sits in the middle and is sandwiched. Next, use four M8 X 20 mm bolts to attach the discharge flange to the top of supercharger.

The other 70 mm idler pulley will now require to be mounted, using an 8 mm spacer, and one M10 X 25 mm bolt. Place a 5 mm spacer inside the idler pulley and then install the bolt through, then place the 8 mm spacer underneath and then install it on to the upper corner of the supercharger bracket.



pic 6: Once this is all done, you should install the drive belt as shown in the diagram below. The correct belt size is 6PK2145 for the V3.62 Eaton M62 based kit. Once the belt drive installation is complete, you can move on to the intake piping.

There are two throttle body relocation dummy adapters included in the kit. Bolt on the one with the crescent cut out to the factory original throttle body mount position on the engine intake manifold. Now, use the stock factory throttle body that you are using on your car, on to the HMW dummy throttle body adapter provided in the kit and mount the throttle body to the dummy adapter using nuts, bolts and washers. You may require to drill the holes larger, if required.

V3 Eaton M62 installation ends here

Basic Piping Guide

Once finished with the installation of the V3.2 or V3.62, you can use a silicone coupler with clamps to attach the throttle body to the rear inlet of the supercharger and begin the intake piping work. You will have to use silicone couplers with aluminium bends to connect an air filter and a MAF sensor to the inlet of the newly relocated factory throttle body, that now comes out of the rear of the supercharger. This step is quite vehicle-specific. The factory 90degree from the M50 and M52, without secondary throttle will work well, adding another 90 3"/76 mm cast elbow, and under the alternator towards the front of the car.

The factory IAT (air temperature sensor) should be placed inside the engine manifold for the most accurate reading of air temperature.

The top outlet of the supercharger will need to be connected to your engine manifold, and this can be done either directly using provided couplers or using an intercooler in between. For the M62 setup, the boost is low and the intercooler is not an absolute requirement but it can help.

We also suggest using a recirculating bypass valve (which is not to be mistaken for a blow off valve) between the outlet and intake of the supercharger, between the MAF sensor and throttle body.

Also note, those with S50, S54 ITB setups, the throttle body relocation part is to be ignored and you must ensure you use a proper sized recirculation bypass valve.

Below is a suggested diagram of the Intake & Outlet Piping for the V3 series. Our V3 silicone hose kit can be made to work with many chassis' variations.



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Intercooling Guide

If you use an intercooler, which is recommended especially for the V3.2 Eaton M90 based setup, then the steps would involve connecting the top outlet manifold of the supercharger to the charge pipe going that goes to the intercooler. And then, have the outlet pipe of the intercooler connect to the engine intake manifold.

pic 14: You can mount the intercooler behind the front bumper. Here we demonstrate this, using two pieces of flat stock aluminium that is bolted to the metal bumper and then the intercooler bolts on to that.





pics 14A, 14B, 14C: You can run the charge pipe in various ways. One is to run it between the power steering pump and front sway bar. Then use two 45-degree charge pipes to connect that to the left side of the intercooler.



You can run the charge pipes from the right side of the intercooler underneath the front of the car over to the left and then a 90-degree up.

pics 14D, 14E: This is an example of how your piping could look like once its plumbed in. Note: this is on an E36. The E46 and other models will be slightly different, so try a few variations till you have found what works best for you.



Final Steps & Tips: Start reconnecting back all the essentials, such as the radiator, which are all reverse of taking it off. Connect all coolant hoses. Open the bleeder valve on the expansion tank and start the fun process of filling the cooling system and trying to get all the air out. While you're waiting for some of the air to bubble up out of the expansion tank, connect the battery and turn the ignition switch a few times off and on, to purge the fuel system. Check for any fuel leaks. If everything looks good, start the engine. It may not run too good at first, since there will still be air in the fuel rail that has to work its way out and the ECU will have to relearn the idle. Turn your climate control up to the hottest setting, check and add coolant as needed till air bubbles are out. Ensure to keep a close eye on the temperature gauge.

Check for any leaks, check to make sure that the bypass valve is open while idling. This helps keep the temperature down in the supercharger. And keep the charge temperature down when the supercharger is not being used. A quick snap of the throttle should make the bypass valve close and then open again, once you release the throttle.



This is what your setups should look like, once it's completed. V3.2 with Eaton M90 & Custom HMW Straight Six manifold on the left. The V3.62 with Eaton M62 retaining the stock BMW engine manifold on the right.

Tuning & Maintenance: Although you can always use some of our tunes provided on request, as a guide, we very strongly suggest getting the car professionally dyno tuned. Eventually camshaft timing adjustments may be required during tuning for better idling and overall performance. The stock ECU ignition and fuel maps are not set up for boost. We have found 36-42 lb injectors to be ideal and a rising rate fuel pressure regulator also helps for small adjustments when tuning. The supercharger's synthetic lubricating oil should be changed every 5000 miles or 8,000 km. Use the oil approved by the manufacturer or the aftermarket. The wrong type of fluid could likely damage the supercharger. All other regular periodic maintenance and inspections of the car, engine & drivetrain should be continued as required and on time.

This concludes the installation of the HMW V3 Series of supercharger kits. For any further questions, support and information, please contact us directly via phone or email at <u>HYDE@HYDEMOTORWORKS.COM</u> or <u>KEITH@HYDEMOTORWORKS.COM</u>. We hope you enjoy your new supercharged BMW and wish you happy and safe motoring!