



KPower E30 Swap Package Installation Guide

KPower Industries and KMiata Inc.
kpower.industries

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KPower E30 Installation Guide

Thank you for purchasing a KPower E30 engine conversion package! We are sure you'll be as thrilled with this engine conversion as we are. Please note that this is an installation *guide* only, and does not necessarily offer complete step-by- step instructions for installation. **Please read through the entire guide before proceeding.**

KPower recommends that this conversion be completed by a professional performance shop. KPower assumes no liability for products that are installed incorrectly, or any resulting damage to your car, engine, or other parts due to improper installation.

Due to the growing size of our company, we are constantly receiving phone calls and emails with installation-related questions. Many of the questions we receive are answered in our installation guides already.

Because of this, please read this entire guide thoroughly before contacting us with questions. We are always eager to help our customers, and we will be more available to answer questions if our customers first take advantage of this guide before reaching out to us for support.

We greatly appreciate your cooperation. If you have questions on something not in the guide, please call or email us at info@kpowerindustries and we'd be happy to help any way we can.

NOTE: this installation guide has details and pictures from a 1990 325i. While the conversion kit can be installed in any E30 (1984-1992), there may be some minor differences between your chassis and the photos in the guide.

Compatible Engines and Transmissions

This swap package is compatible with the following engines:

- K24A2 (2004-2008 Acura TSX)
- K24A (JDM version, 200hp with RBB head, TSX equivalent)
- K24A3 (TSX equivalent found in various markets internationally)

Additionally, the engine mounts will fit the K20Z3 engine (2006-2011 Civic Si), as well as the K24A4 block from the Accord. They do NOT fit the K24A1, K20A2, K20Z1, or JDM K20A blocks.

A PRB style cylinder head can be used (K20A2 and K20Z1, 2002-2006 RSX) but it needs to be paired with our PRB intake manifold and PRB upper coolant neck.

For most customers, a full K24A2 or K24A engine is the best starting point for this swap.

While other E30, E36, and E46 transmissions likely can be made to work with this swap, we have tested it with the following transmission options:

- Getrag 260 5-speed, found in 1986-1992 E30 325i and 325is cars.
- ZF 5-speed (S5D 320Z), found in E36 and E46 5-speed cars with 2.8L or larger engines (328i, 330i, M3). They are also found in some Z3 and Z4 vehicles with the same engines.

If you're installing a ZF 5-speed in your E30 with this swap, please do your research as you will need to make some changes to the driveshaft, shifter carrier, and selector rod. Installing a ZF in a K series powered E30 is the same process as installing it in another E30.

In a nutshell, the easiest combination of parts to do a ZF installation would be to source all of these parts from an E36 M3 that has a driveshaft with a four bolt output flange.

Chassis Preparation

The KPower E30 swap is completely bolt-in, with no chassis modifications required. Because of this, installation is quite straightforward.

The factory engine, transmission, driveshaft, exhaust, engine wiring harness, radiator, and hood can all be removed from the vehicle in preparation for the swap. Be sure to disconnect the battery before proceeding.

We highly recommend upgrading to a BMW Z3 steering rack at this time due to the much quicker ratio, and also to gain improved clearance around our oil pan. If the car will see heavy track use, this is also a good time to weld subframe reinforcement plates to the subframe.

Preparing the Engine

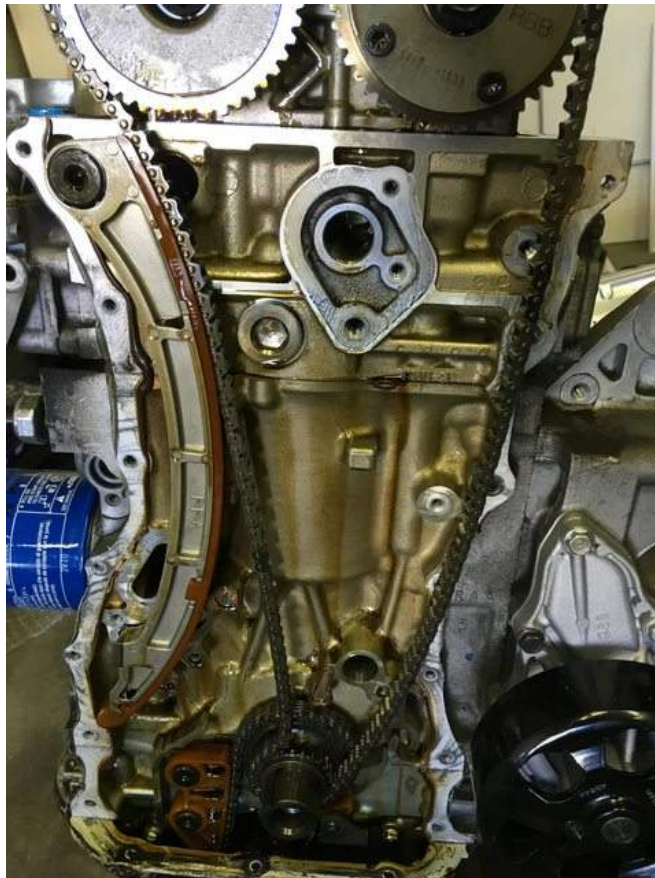
The K24 engine can be prepped before anything needs to be removed from the E30. This guide assumes that a stock K24A2 engine is being used.

To install this engine in an E30 with our swap package, you will need to install a K20 RSX Type S oil pump, chain, guide, and windage tray which deletes the balance shafts found in the K24 oil pump. We also recommend installing a 50 degree VTC gear to increase midrange power and torque.

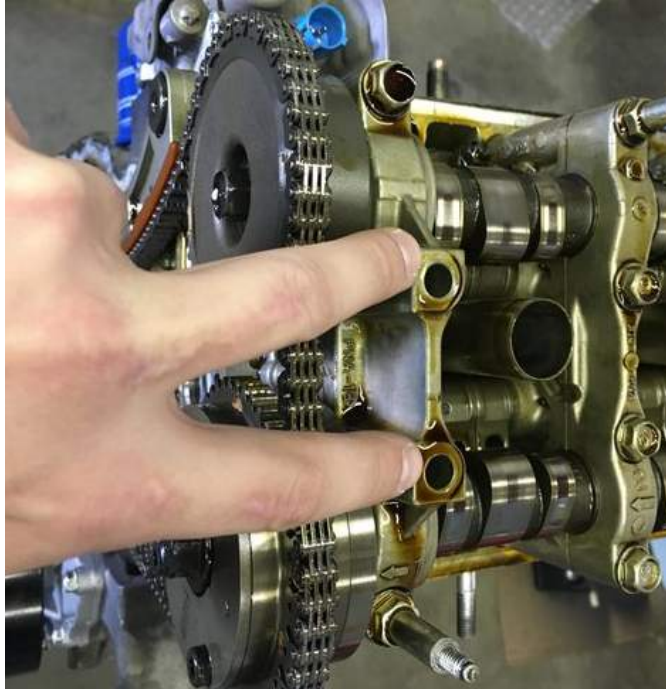
All of these OEM parts are available on our website or from your local Acura parts source.

K20 Oil Pump Installation

The first step is to set the engine with cylinder 1 at top dead center (TDC) and to pull the timing chain cover. Remove the valve cover, then remove all the 10mm bolts around the edges, as well as the VTC solenoid in the center of the cover, and the two bolts next to it. This is RTV'd to the front of the engine, so pry lightly to break the seal. Remove the factory tensioner, which sits on the lower left-hand side of the timing chain, as well as the right-hand chain guide.



Next remove the upper chain guide. Once it's gone, remove the OEM chain and set it aside. We generally recommend replacing the timing chain tensioner at this time, but typically the chain guides and chain can be reused.



Flip the engine over and remove the factory oil pan, and clean off all of the old RTV with a razor blade and scotch brite pad. You'll be left with the factory K24 oil pump, which incorporates the balance shafts. The steering rack and subframe needs to occupy this entire space, so the balance shafts (and the oil pump) have to go.

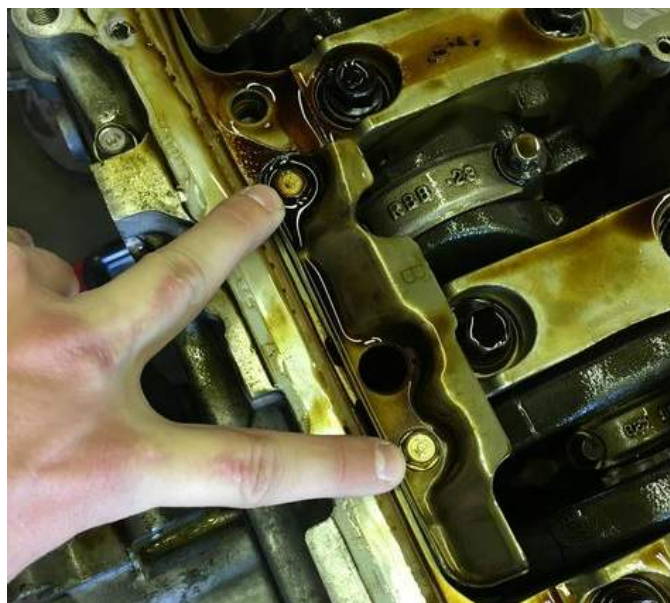


Here's the chain which drives the oil pump. It sits behind the OEM chain and has its own tensioner. This tensioner will get reused but the guide and chain are unique to the K20 pump. The tensioner and guide both need to be removed to get the oil pump off.

Unbolt the factory oil pump and remove it. The chain won't come off first, so you'll have to wiggle the gear off the crank at the same time. It's easy to do, so don't force anything.



You will also use a new K20 windage tray to match the new K20 pump. Remove the OEM windage trays:





This small orifice needs to be removed and plugged in to our block. Use a wood screw to give it something to grab onto, and then pull it out. Alternatively, you can often remove it with a small, but sharp, drill bit. Start drilling into the center until the bit digs into the plug, and then pull it out on the bit. It's held in with an o-ring, so it shouldn't take a huge amount of force.





Once it's out, the block will have threads. Simply install a bolt to plug it. Our oil pump kit now includes this bolt (M8x1.25 thread pitch, with a socket head). Add some RTV on the threads to ensure a good seal.

Next, unbolt the two halves of the oil pump with the five 10mm bolts, and install the KPower oil pump adapter in its place.



Then the entire pump assembly can be installed on the block. In order to make it all fit, you'll need to hang the crank gear from the chain and slide it.



New chain, chain guide, and chain tensioner can now be installed onto the engine. The oil pump chain tensioner for the K24A2 is the same as the K20 part, and it only needs to be replaced if the tensioner surface is worn.



The E30 specific pickup tube can also be installed at this time with two M6 bolts.



(note: the billet lower timing chain guide in this picture is not a part of this swap package and is also not required)

The K20 windage tray can also be installed at this time.



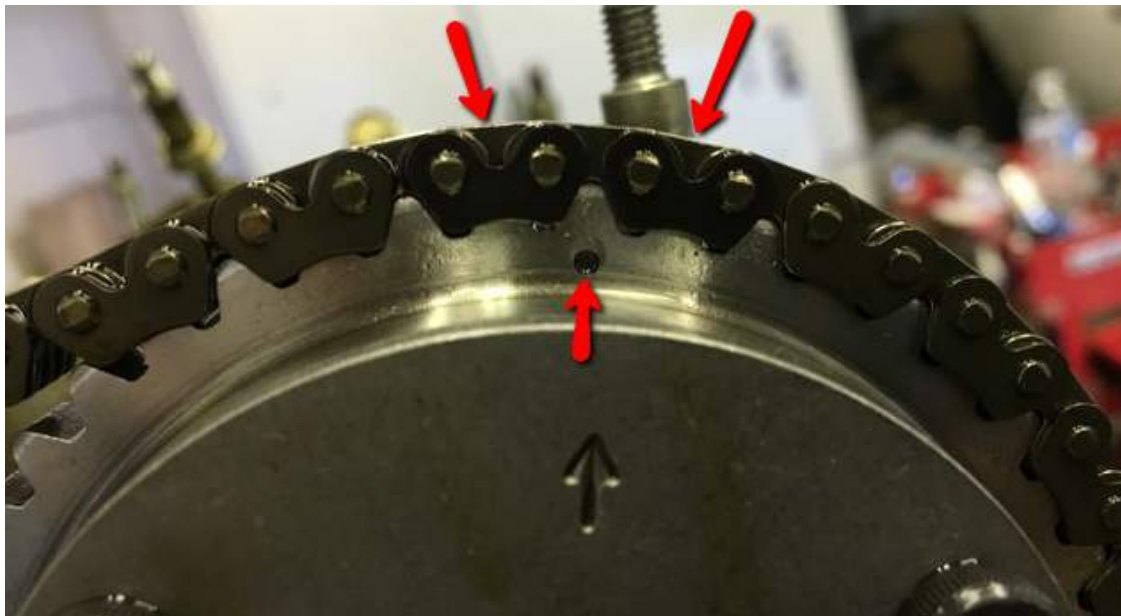
At this point, the K20 oil pump with the pump adapter, new oil pickup tube, K20 windage tray, and the oil pump chain/tensioners all reassembled and tightened down, so the engine can be flipped back over.

Timing The Engine

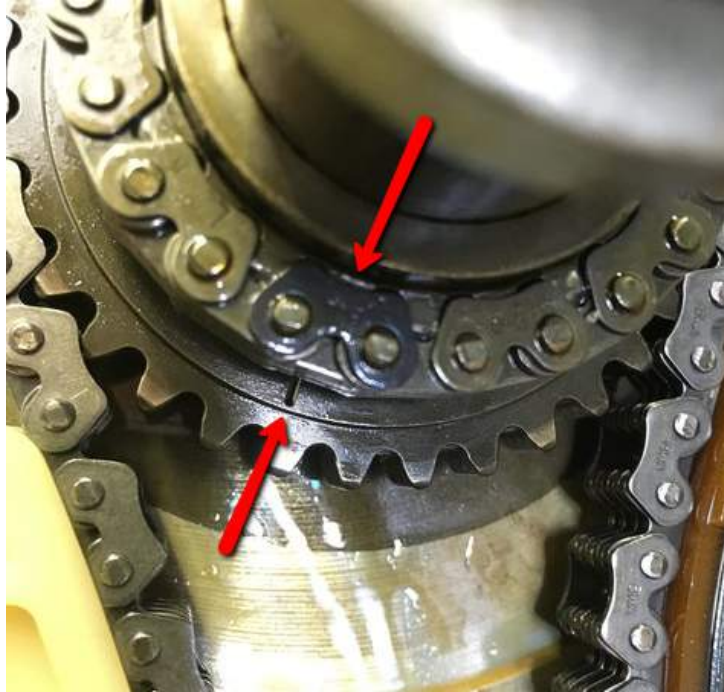
Assuming you'll be upgrading your VTC gear, at this point you'll want to remove the 25 degree VTC gear and install the 50 degree unit (part **14310-RBC-003**). Use an adjustable wrench to hold the cam in place as you break the 17mm cam bolt free. Slide the old gear off and slide on the new one and torque to 89 lbs. Now it's time to set the timing and install the new tensioner.

The K24 chain makes it easy to set the timing from scratch. There's a small dot on the cam pulleys and a small mark on the crank pulley. The timing chain has dark-colored links which correspond to the dots on the various pulleys.

Cam pulley dot lines up with the dark chain links:

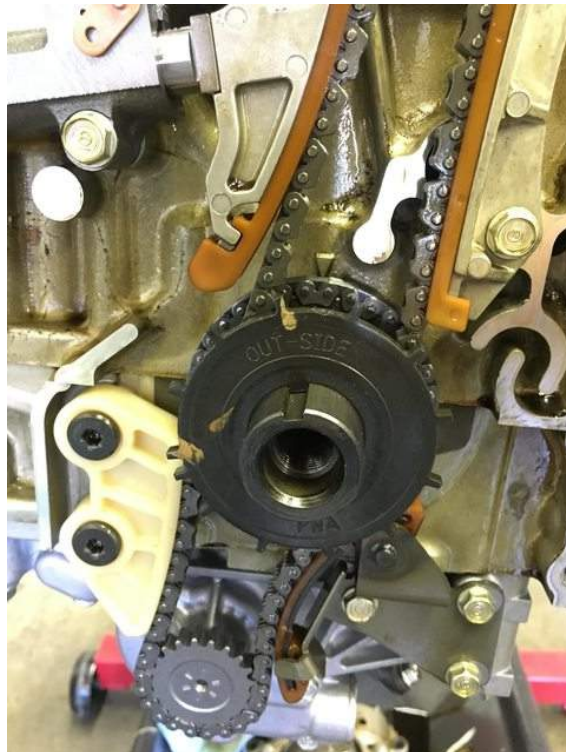


On the crank, there's only one dark link, and the mark lines up in the middle of that link.

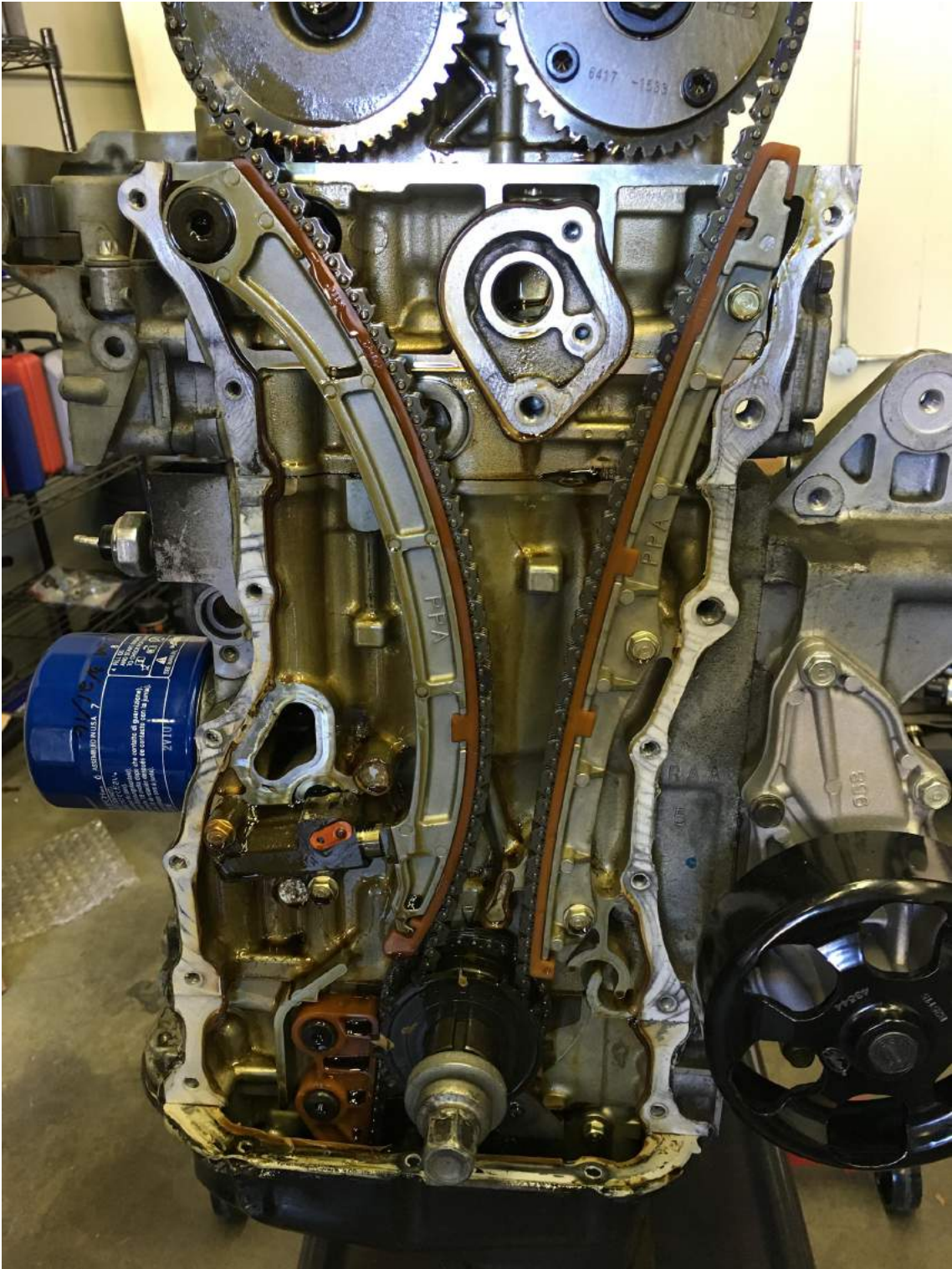


Install the chain guides and tensioners by pinning the tensioner back, then pull the pin and the tensioner will auto-tension the chain. When the engine is running, tension is created with oil pressure, but there's also a ratchet system to maintain chain tension during engine startup.

Next install the crank trigger wheel with "outside" facing the outside:



Now is a good time to perform any other valvetrain upgrades before timing the engine, installing the timing chain, and installing a brand new OEM chain tensioner if you desire.



Installing the Oil Pan

The KPower E30 oil pan can be installed in the same fashion as the OEM Honda pan. Test fit the pan first, and make sure that the flange is sitting flush on the block with no clearance issues. When you're ready to seal it, put a bead of Honda Ultra Flange or Permatex Ultra Black on the engine on the INSIDE and OUTSIDE of all of the bolt holes.



This photo shows a pretty sloppy bead of RTV. To avoid this, we generally use the Valco 2.5" wide Tube-Grip device (part **202-42**, available on Amazon) to apply an even bead.

Carefully set the pan on top, and finger tighten all of the brand new oil pan bolts we've supplied. Let it sit for a minute to oxidize, and then tighten up all of the bolts in a cross pattern. Torque spec is 9 lbs.

Once everything is dry and tightened up, the engine can be flipped back over, and the timing cover and valve cover can be re-installed.



Our oil pan is designed to work with the factory K series dipstick. Just snip off about 1/4" of material from the bottom of it, and both dots will still be visible. Fill oil to the top dot just like stock.

Upper Coolant Neck

The E30 upper coolant neck can also be installed at this time. We missed taking a picture of this piece on the actual installation, but it's location is self-explanatory. Just remove the OEM water neck that would protrude into the firewall, along with the two studs. Replace it with our piece and the four supplied bolts. The gasket can typically be reused, but replace it if it's deteriorated.



If you're running heat, use the supplied 90 degree fitting and orient it pointing up and towards the header core. Don't forget to use teflon tape.

The M14x1.5 bung welded to the pipe is for your factory BMW temperature sensor for the stock water temperature gauge. Install the sensor there, and our wiring harness is the perfect length to plug right in.

Mating the Engine and Transmission

The adapter plate and flywheel can be bolted to the engine at this time.



Adapter Plate

All required hardware is supplied. The bag containing the hex head bolts has the hardware to bolt the adapter plate to the engine. The three 30mm bolts are installed in the transmission side counter bores, and the remaining three bolts thread in from the engine side of the plate.

The bag containing the socket head bolts has the hardware to bolt the transmission to the plate once the flywheel and clutch are installed.



The K to Getrag 260 adapter works with both factory K series engine side dowels. In the rare event that your donor engine came from a vehicle originally equipped with a manual transmission, the engine dowel pins will be too long to fit inside the adapter plate. You will need to replace them with the shorter 15mm dowel pins from an automatic car, Honda part **90701-PW5-000** (quantity 2).

The K to Getrag 260 adapter kit also includes two BMW dowels for use on the transmission side.

The K to E36/E46 adapter plate requires that the intake side transmission dowel (below the starter) be removed and replaced with the D shaped machined dowel included in your hardware kit.

This adapter plate also includes a single BMW dowel for use on the lower exhaust side of the plate on the transmission side. The small diameter starter pin on the upper intake side is also used to locate the transmission on the plate.

Flywheel and Clutch

Your flywheel is packaged with two pilot bearings with different inner diameters. The 12mm ID bearing is used for the Getrag 260, and the 15mm ID bearing is used for an E36/E46 transmission. The 15mm ID bearing needs to be installed with the supplied 1mm shim behind it.

Regardless of bearing choice, the bearing should be secured with the supplied snap ring.

Use Acura part **90011-RDB-000** (qty 8) for the flywheel bolts, available on our website or through any Acura dealer. Torque to 90 lbs with a 12 point 17mm socket.

Regardless of transmission being used, you'll be using a clutch kit from a 2001-2003 BMW 330i. This is the larger clutch kit from the E46 chassis, and the same style pressure plate as the E46 M3 and E39 M5.

For builds using stock, naturally aspirated engines, we use the OEM replacement LuK clutch, part **03-049**. For setups making more power, any high performance clutch from a 330i 5-speed can be used.

The clutch can be installed as normal, and the pressure plates torqued to 20 lbs.



The supplied extended release bearing is used in place of the shorter OEM bearing, and it installs in the same manner:



We recommend replacing the plastic pivot pin with the stainless steel version available from BMW, part **21 51 1 223 281**. We also recommend replacing the pivot pin retaining clip.

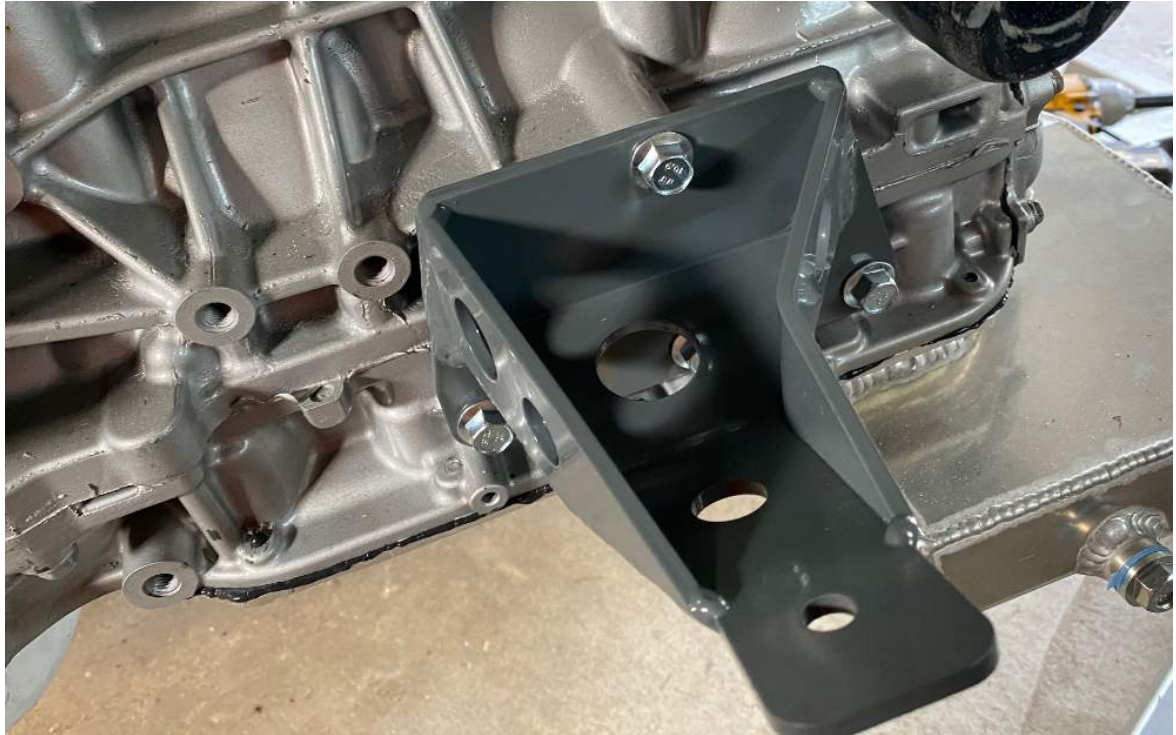
Bolting on the Transmission and Mounts

Before the transmission can be installed, the bellhousing needs to be notched to clear the K series starter. We have found the best way to do this is to mock up the transmission on the adapter plate with the starter installed on the engine to indicate the location for the cut. Then use a 2" hole saw to cut a semicircle into the side of the bellhousing.

The transmission can then be installed on the adapter plate with the supplied hardware.



Engine mount arms can also be bolted to the block at this time.





Engine and Transmission Installation

The engine, transmission, and accessories can be installed into the engine bay in the same manner as the stock engine. [Before installing the engine, we recommend removing the black mat on the firewall to provide enough clearance for the K24.](#)

We also recommend bolting the AKG mount pads to the subframe loosely and then lowering the drivetrain in with a hoist so that the upper bolts can be easily lined up with the mount arms.



The factory rear transmission mount can be reinstalled, and we recommend upgrading to hard rubber or poly rear transmission mount bushings. The shifter, carrier, and selector rod of your choice can also be installed, along with the driveshaft. Everything from the bellhousing rearward is installed just like stock.

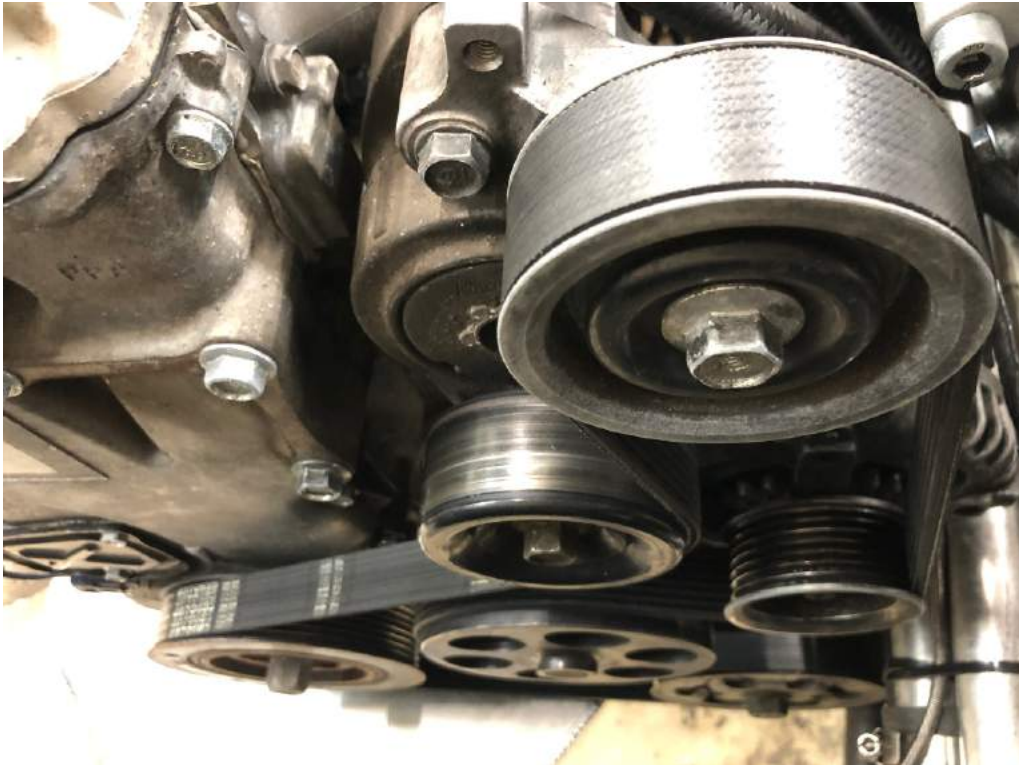
Some customers may need to lightly trim the driver side steering rack bracket on the subframe to be sure there is at least $\frac{1}{8}$ " of clearance between the bracket and the oil pan.



Engine Accessories

Thanks to our KPower intake manifold and the unique throttle body positioning, the factory K24

auto belt tensioner, idler pulley, and alternator now fit in the factory configuration. This popular setup uses all OEM Honda parts: **31190-RRA-A00** (pulley), **31175-PRA-000** (bracket), **31185-PCX-003** (bearing cover), and **90031-PRA-000** (bolt). If you're installing this setup on a JDM K24A water pump housing, you will need to use some spacers to put the pulley in the correct location.



If you're running a car with no air conditioning, no power steering and the stock K24 crank pulley, use belt [7PK1320](#) along with the popular EP3 idler pulley setup.

If you are installing an A/C compressor in the stock location, or our new power steering kit system that relocates the pump below the alternator (pictured above), you will need a longer belt (more info coming soon)

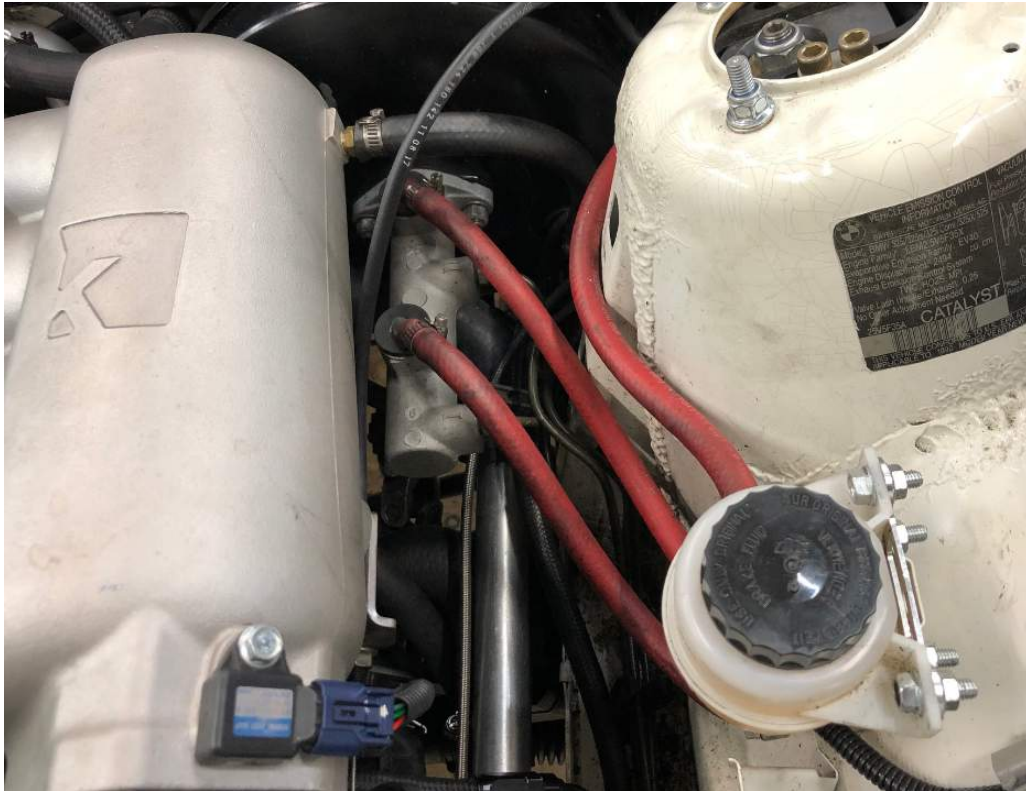
To install the belt, use a 14mm wrench to pull back the tensioner to slip it over the pulleys.

Any K series starter will work with this swap, although a starter that came from the same donor as your engine harness will make it a bit cleaner.

Brake/Clutch Reservoir Relocation

On left hand drive vehicles, the KPower intake manifold clears the factory E30 brake booster

and master cylinder, but interferes with the reservoir. Because of this, our E30 swap package includes a factory BMW remote reservoir, fittings, grommets, and brake fluid hose, along with a mounting bracket and hardware.



Installation is done as pictured above. *Production swap packages include actual OEM BMW black brake hose and not the red hose pictured.*



This is also a great time to install our favorite (and inexpensive) E30 brake upgrade: a E32 7-Series 1" master cylinder, BMW part **34 31 1 156 643**.

Radiator and Heater Hoses

The radiator hose routing with this swap takes a little creativity due the positions of the engine and radiator inlets. Additionally, the E30 radiator has 1.5" inlets, and the K series engine has 1.25" inlets.

Our setup was done using a couple stock E30 hoses for the radiator side, a couple spare 1.25" hoses closer to the engine, and some 1.25" aluminum pipe from McMaster Carr. If there is enough demand, we will produce a set of radiator hoses specifically for this swap.

We used the smaller M42 radiator for our swap with the integrated reservoir on the driver side, and have had no cooling issues. However, customers in hot climates with cars that see heavy track use may want to use a larger aftermarket M20 radiator.

We also used the stock M42 hose (BMW part **11 53 1 709 052**) to connect the reservoir to the engine. We do this by cutting the $\frac{5}{8}$ " thermostat bypass hose between the thermostat housing and intake manifold, and installing a T barbed fitting in the middle so the reservoir hose could be plumbed into the center. Thanks to our customer Frank for the photo:



If you're deleting heat, use the Hybrid Racing lower thermostat plug available on our site. If retaining heat, the heater hoses can be done with a couple lengths of $\frac{5}{8}$ " heater hose, a 90 degree molded $\frac{5}{8}$ " hose, and a couple $\frac{5}{8}$ " barbed couplers.



We also highly recommend using our K series heater port adapter to delete the black hard pipe and clean up the heater hose routing under the manifold.



ECU, Engine Management, and Wiring

PLEASE READ these details before calling us for wiring questions and technical support. As of September 2020, KPower supports one wiring harness and ECU combination for this swap. Some customers may opt to use a standalone (Haltech, ECU Master, Megasquirt etc), in which case our wiring conversion harness would not be used, and all wiring would be custom.

Our current supported wiring and ECU setup requires the following components:

- 1) Hondata Kpro4 engine management, installed in a 2002-2004 RSX (PRB or PND) ECU.** The ECU can be sourced from any 2002-2004 Acura RSX (base or Type S, manual or auto). The engine wiring harness and charge harness must also be sourced from the same vehicle. Auto and manual transmission harnesses can both be used, although the manual harness will have fewer extra transmission connectors to delete.
- 2) An engine wiring harness and charge sub harness from any 2002-2004 Acura RSX.** Alternatively, one of our brand new **KPower RWD Engine Swap Harnesses** can be used instead of the two OEM harnesses for a cleaner installation.
- 3) The KPower plug and play conversion harness supplied with our swap package.** This harness is two pieces and includes an under dash cabin harness portion, and an engine bay sub harness that connects to the E30 fuse box connector (C101).

All of these components are needed, there is no overlap. You will be running a factory configured Honda ECU and engine harness in your E30 thanks to the KPower plug and play conversion harness. The BMW ECU (DME) will be removed from the vehicle.

Other ECU and harness combinations may work with this swap, but in an effort to provide the most clear information to our customers, we do not provide wiring or ECU support to customers using other components.

Additionally, if you're using Kpro and an RSX harness and do not want to replace any connectors, you'll also want a K20 style crank position sensor and a K20 knock sensor.

Our conversion harness also includes a connector in the cabin portion of the harness for a factory RSX Type S wideband O2 sensor. Use Denso part **234-9005**, available on Rockauto.com or anywhere auto parts are sold.

If you would like to run an aftermarket wideband, Kpro4 is now compatible with a variety of different sensors, so the OEM style sensor is no longer needed. Visit Hondata.com for more details.

If you are running an idle air control valve (IACV) then you will need one from a 2003-2005 Accord or 2003-2006 Element, Honda part **16022-RAA-A01**. An OEM one is best (new or used), or any of the green aftermarket units. Avoid the cheap silver \$20 parts, they don't hold up very well. For dedicated track cars, we generally delete the IACV to eliminate a failure point and reduce cost. You can use our IACV blockoff plate to easily do this.

Wiring Harness Connector Overview

Here is an overview of the layout of the wiring conversion harness routing. It only fits together one way, but to avoid confusion here are detailed photos with the function and/or location of each connector.

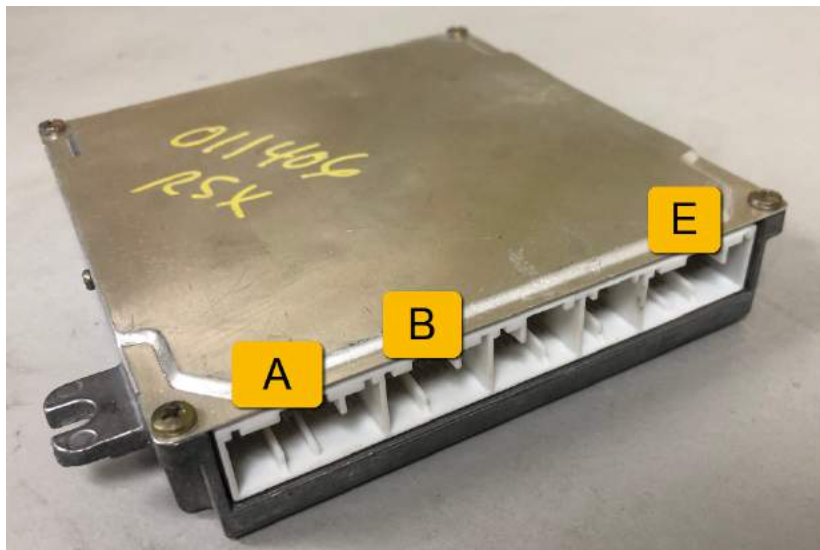


Engine bay sub harness

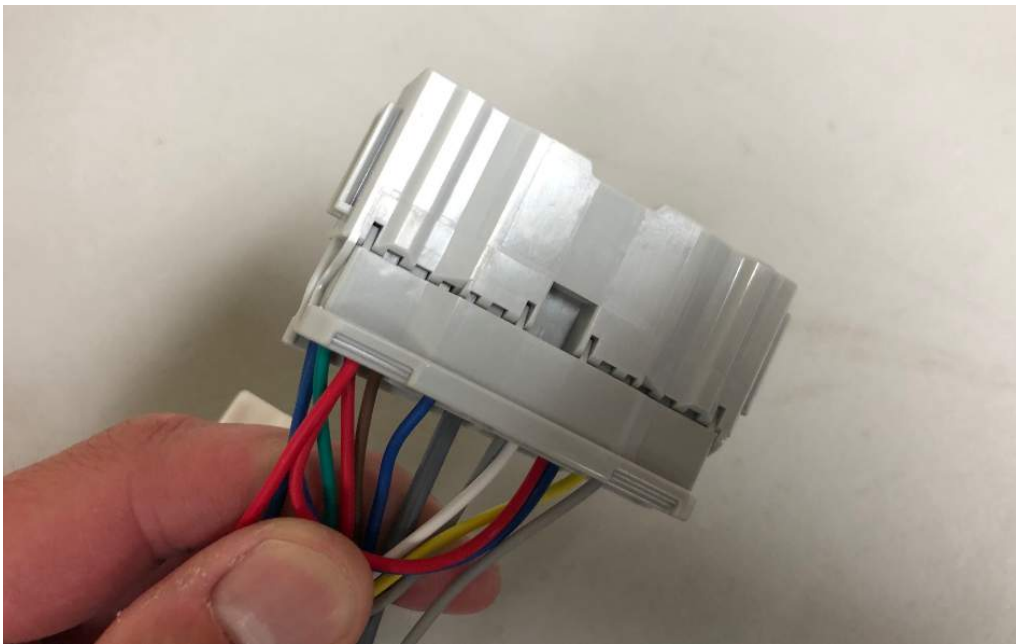


Cabin under-dash conversion harness

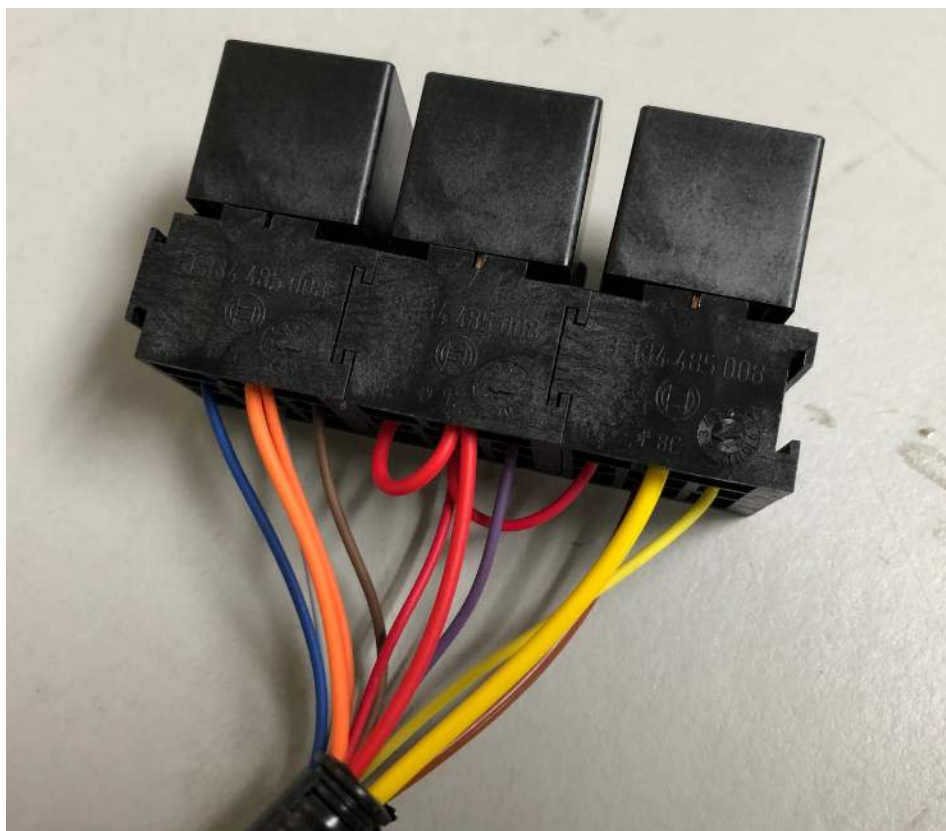
02-04 ECU. You'll only use ports A, B, and E. Your K series engine harness connects directly to A and B:



The engine harness also connects to the larger gray connector (also called C101):



Main, fuel pump, and O2 sensor relays. Mount under dash above glove box:



This is the ECU E connector:



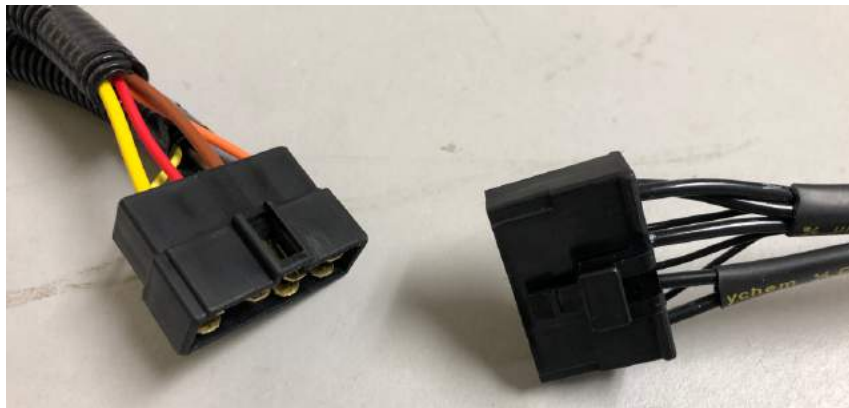
This is your OEM O2 sensor connector that can be routed through the shifter tunnel to an O2 sensor bung:



The OBD2 scanner port can be mounted under the dash anywhere you like, or rolled up inside the glovebox:



The black 8 pin connectors are used to attach the engine bay sub harness under the dash to exit through the factory E30 firewall opening:



The round black E30 C101 connector runs behind the engine along the firewall and connects to the round connector next to the fuse box:



This eyelet and 30A inline fuse connects to the power lug on the right side of the firewall to supply constant 12V power to the harness and ECU:



This black 2 pin connector attaches to the factory E30 water temperature sensor that gets threaded into the welded pipe on the upper water neck.

The firewall grommet can be cleanly sliced at the bottom and reused. Here is the installed engine bay sub harness. Note that our RWD engine harness is also pictured, and not the bulkier OEM harness.



The engine harness connects to all factory sensors in the factory locations. The TPS, MAP, and IAT connectors will need to be extended on the OEM harness since the throttle body and intake piping is on the other side of the manifold. We carry a MAP and TPS extension harness on our site for this reason.

Charge Harness Wiring

There are a number of ways that the charge harness can be wired on a K swapped vehicle.

Overall the charge harness wiring is simple: the E30 positive starter wire needs to be attached to the K starter, and the E30 positive alternator wire needs to be attached to the K alternator.

If you are using an OEM wiring harness, the separate charge sub harness needs to also be used, as it includes the connector for the alternator, starter solenoid, and knock sensor. Our recommendation is to remove the wire loom off the charge harness and remove the two large positive battery wires from the sub harness that are intended for the alternator and starter and run them outside of the harness. This is how our KPower engine wiring harness is configured.

The easiest way to do the charge wiring in the E30 is to bolt the E30 starter positive battery wire directly to the K series starter, and then use a small 4 gauge wire to jump power from the starter

to the alternator. The KPower wiring harness includes a 15" length of 4 gauge wire with two eyelets specifically for this reason.

Additional Wiring Details

Engine/Chassis Grounds

Grounds are a big deal on K series engines. You must have at least three engine to chassis grounds of 4 gauge wire or larger, or you may experience a wide variety of issues.

We recommend a ground from the engine block to chassis, cylinder head to chassis, and timing chain cover to chassis.

Radiator Fan

Our test car uses a SPAL 16" puller fan mounted to the OEM radiator (SPAL part **301100400**). It is controlled by the OEM fan switch found in the passenger side of the radiator.

We recommend using the 80/88 C° switch from the 318i (BMW part **61-31-8-361-787**) and wiring to the 88 C° pin, which will allow the factory E30 wiring to turn on the fan at 88 C°, which is 190 F°. Street cars in hot climates may want to use the 80° pin (176 F°).

Tachometer

Secondly, for the OEM E30 tachometer to work for the higher redline of the K series, a late model gauge cluster must be used (1988-1992) that has the tach coding plug in the front of the cluster.

In order to get the proper tach signal, you will also need to use the 4 cylinder coding plug from the M42 four cylinder cars, BMW part **62-11-1-394-321**. We always rev our K24A2 engines to at least 8000 RPM, so now is also a great time to have your entire cluster rebuild and any non-functioning components repaired. We highly recommend the work of Diego Mendizabal, who not only repaired our damaged cluster but also installed a beautiful OEM quality 9000 RPM tach face for us. You can reach Diego on Instagram @e30_dad or by email at bimmerhead1@gmail.com.



Fuses

We recommend replacing every 30+ year old fuse inside the fuse box with new high quality fuses. Original E30 fuses are so old at this point, and your fresh electronics should be run with new fuses.

Throttle Position Sensor (TPS)

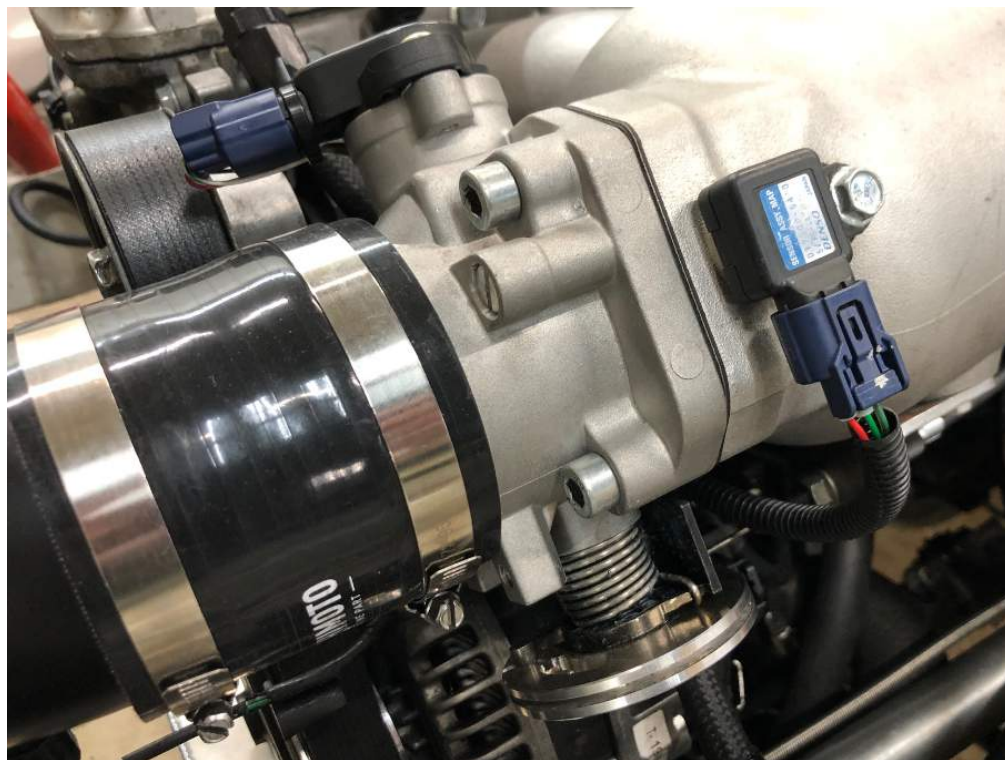
The throttle body supplied with our KPower E30 package is a B series style 74mm unit, with an upgraded throttle cable pulley to match the E30 pedal ratio. Because of this, the often-faulty OEM K series TPS can be avoided and an OEM B series style TPS can be used in its place.

Steer clear of the cheap K or B TPSs sold under various labels. Either use a used OEM unit, or the best option is the Acuity K series Hall Effect TPS available on our website. Be sure to add the \$16 TPS adapter if you choose to go this route. This TPS has operated flawlessly for us since we originally started using them.

Intake and Exhaust

Your swap package includes our one piece cast intake manifold, which installs like stock. Bolts should be torqued to 16 lbs. Our throttle body bolts to the manifold, as well as any OEM K series style fuel injectors and fuel rail.

The stock 318i (M42) throttle cable works with our throttle body and supplied cable bracket. We slotted a couple spare M8x1.25 flange nuts to lock the throttle cable in place on the bracket.



A 3" intake pipe can be routed in a variety of ways. Since the K series performs very well with long intake length (18-24" or more), we routed it to the passenger side, and will eventually build

an air box and headlight duct.

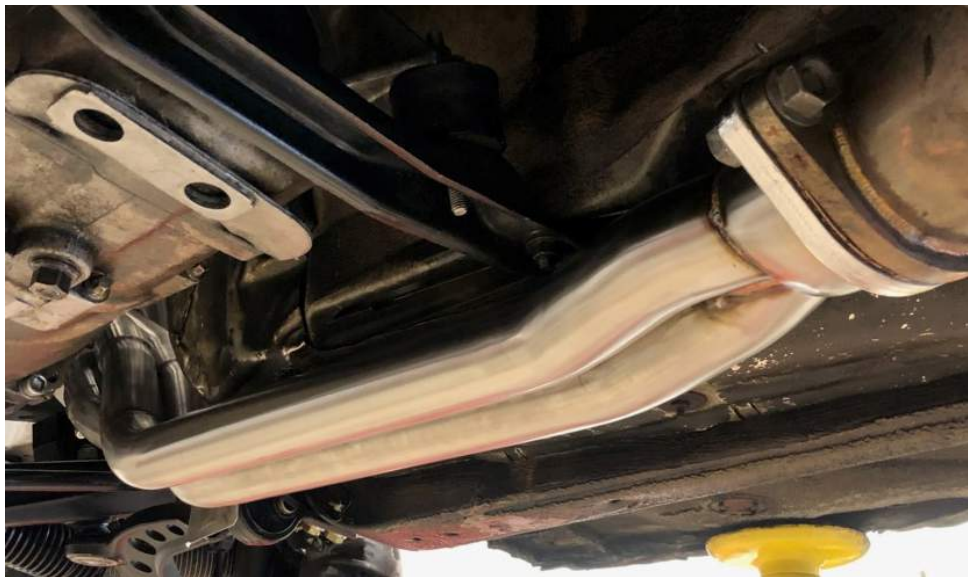
Your intake air temperature sensor (IAT) needs to be installed in your intake pipe as well. We just drilled a hole and used a universal grommet to pop it into the tube.



For naturally aspirated builds, our KPower E30 header is the ideal choice. Installation is self-explanatory. First slip the two sections of the header together at the collector and tighten the two long retaining bolts, and then install the entire header from up top in the engine bay.



Our header ends with a universal two bolt 3" exhaust flange, so your 3" exhaust can be built with a flange and piping from any supplier.



Fuel System

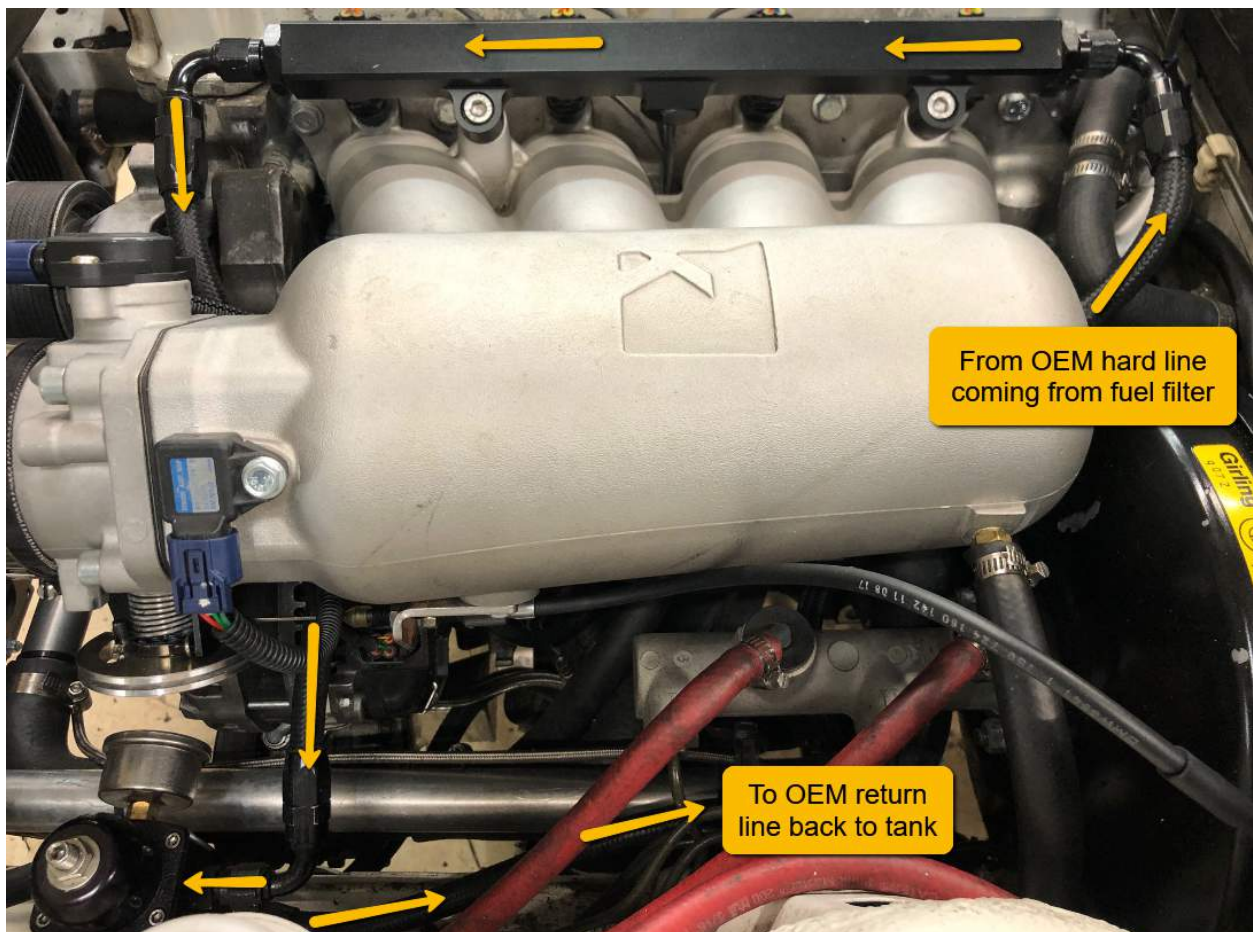
Since the E30 has a return fuel system from the factory, we recommend converting the K series from returnless to a return system and routing the fuel lines in the OEM E30 configuration.

Our fuel system is routed as follows:

In-tank fuel pump → feed line from tank → OEM E30 fuel filter → K series dual port fuel rail → external fuel pressure regulator → return line back to fuel tank.

This system can be done with many different types of components, but we've successfully used:

- Walbro 255lph fuel pump
- 5/16" to -6 AN adapters (qty 2, various brands available)
- 6 AN hoses, any brand
- Karcepts fuel rail (available on our site)
- FUELAB fuel pressure regulator (also available on our site)



Initial Startup Instructions

Uploading a Basemap to Kpro

When you open KManager and connect to your ECU, you can click “New Calibration” and select a basemap from a stock 2004 TSX. This needs to be uploaded to the ECU before your car will start.

Feel free to also email us for the tune from our E30 test car.

Priming the Engine

Extra care should be taken to start up your car for the first time.

First, add oil to the engine and read the oil level from your trimmed dipstick. Fill to the top dot on the dipstick, which should be over 7 quarts on a completely dry engine. For stock engines, we recommend any high quality 5w30 synthetic.

The battery can also be reconnected at this time.

Before the first start up, disconnect all four injector connectors and key the car on. You should hear your relays click on and your fuel pump prime. Do this a few times and inspect your fuel lines and rail for any leaks.

Next, unplug all four injector connectors and crank the starter for about 60 seconds so oil can start to be pulled into the oil pump and the bearings are not run dry. If you have an external oil pressure gauge, you should be able to see 30+ psi when cranking.

Once this is done, reconnect the injectors. If you have done everything correctly the engine should fire right up.

Bleeding the Cooling System

To burp air from the cooling system, we have tried a number of methods on the E30. The

process that has worked best for us is the “cold bleed” method as follows:

- 1) With the engine cold, jack up the front of the car in the air and remove the radiator/reservoir cap and also the bleeder plug from the top of the radiator.
- 2) With the engine still off, add your desired water/coolant mixture to the reservoir. The engine will take it in quickly at first, and it will continue to slow down.
- 3) Keep adding coolant until about two gallons has been poured in and coolant is coming out of the radiator bleeder screw. This may take quite a while because of how slowly the reservoir level drops, but it will keep taking coolant until coolant comes out of the bleeder.
- 4) Once this is done, close everything up and start the car. You should be able to let it warm up until the fan kicks on, and if you truly don't have any air left in the system (and your fan switch is wired correctly) then the fan should shut off once the temperature drops.

We typically see operating temperatures around 190 degrees. Anything from 180-215 is acceptable for on track performance, but below 200 is ideal.

TPS and Idle Calibration

Your TPS and idle will also need to be calibrated in Kpro. Once the car is running, you can adjust the throttle stop screw to open or close the throttle body to set RPM. Generally, we recommend a bit higher of an idle, between 1000 and 1200 RPM. It's also ideal to allow more airflow through the throttle body and then lower the duty cycle of the IACV in Kpro to bring the idle back down.

When calibrating the TPS in Kpro, in the parameters window, click the throttle tab and then press the yellow lightning icon at the top of the page to datalog. Click Read to record the minimum reading, and then step the gas pedal to the floor to record the maximum reading.

For the smoothest tip-in, we also recommend subtracting 5% from the minimum total (especially important with the Acuity TPS. So if your reading is +2%, manually key in -3% and then save the file and upload the tune. For whatever reason this improves drivability.

Dyno Tuning

Every new engine swap should be dyno tuned before being driven at wide open throttle. Additionally, many drivability questions that we receive relate to tuning, so before contacting us

stating that your vehicle doesn't seem to be running well, please arrange to have your car tuned by a qualified K series tuner. We do not have a tuner on staff, so we are unable to help with detailed tuning questions.

Congratulations on successfully converting your BMW E30 to K series power! If you have any feedback on this installation guide, please email us at info@kpower.industries.

Troubleshooting

In an effort to help our customers diagnose any wiring issues with their builds, we've now included some steps to check in case your engine doesn't fire up immediately. Diagnosis beyond these simple checks should be done by a qualified technician with a thorough understanding of vehicle wiring.

- 1) **GROUPS.** Check them all, make sure there is continuity to ground everywhere. This can't be stressed enough. Don't forget about the engine wiring harness ground!
- 2) TPS and MAP sensors need to be plugged into the correct places on the harness. The car will not start if they are mixed up. It will also prevent the ECU from fully powering up, and will keep the fuel pump from kicking on.
- 3) Make sure when the vehicle is keyed on, a check engine light appears, the main relay clicks, and the fuel pump relay kicks on the pump for a couple seconds to prime it. All of these things must happen in order for your vehicle to start. If one is not happening, check steps 1 and 2, and recheck your wiring.
- 4) No fuel or no spark? Check continuity back from the coils and injector connectors back to the ECU. Check continuity from all other sensors back to the ECU.
- 5) Make sure all sensors, especially the crank and cam sensors, are undamaged and in good working order. If using a used harness, make sure it is undamaged with no shorts to the chassis or exposed wires.
- 6) If using Kpro, make sure a tune is actually uploaded to the ECU. If the ECU is empty, the car will not fire up.
- 7) Make sure the immobilizer is disabled in either Kpro.
- 8) Check that all pins in the conversion harness are in place, particularly the ones in the relay blocks. The harness should be handled with care, and mounted in a safe location so no wires can get caught and pulled out of place.
- 9) If using a used alternator and starter, make sure they are in good working order by bench testing them. Keep in mind that any used components could potentially be non-functional.

Commonly Used K series Torque Specs

Valve cover	7.8 lb-ft
Camshaft caps	16 lb-ft
Intake cam gear	83 lb-ft
Exhaust cam gear	51 lb-ft
Intake manifold	16 lb-ft
Exhaust manifold	33 lb-ft
Timing chain case	8.7 lb-ft
Crank pulley	181 lb-ft
Windage tray	8.7 lb-ft
Oil pump 8x1.25	16 lb-ft
Oil pump 6x1.00	8.7 lb-ft
Oil pan	8.7 lb-ft
Flywheel	90 lb-ft
Pressure plate	20 lb-ft