



**KPower 86 Swap Package Installation Guide**

**KPower Industries**  
**[www.kpower.industries](http://www.kpower.industries)**

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# KPower Installation Guide for K24 BRZ/FR-S/86

Thank you for purchasing a KPower 86 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 for any resulting damage to your car, engine, or other parts due to improper installation.

The photos and details in this guide were compiled during a start-to-finish swap in our second 86 shop vehicle. Thanks to our growing team, we've created not only the most thorough engine swap package on the market but also an equally thorough installation guide.

Please take advantage of this by carefully reading the entire guide before beginning the project and before contacting us with questions.

Many of the questions we receive are already covered in our installation guides. If you have a question that isn't answered in this guide, we'd love to help. Please call or email us at [info@kpower.industries](mailto:info@kpower.industries) and we'd be happy to assist in any way we can.

Note that this installation guide has details and pictures from a 2014 BRZ Limited (USD, left-hand drive). While this conversion package can be installed in any 2013-2020 FR-S, BRZ, or 86, there may be minor differences between your chassis and the photos in this guide. This guide also assumes you're using our Complete KPower 86 Conversion. If you are using a Builder Kit or Race Package, you won't have all of these items and some sections of the guide won't apply to your build.

## 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 our right side upper water neck is designed to work with a RBB and RBC head only.

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

Our adapter plate and flywheel are designed to pair the factory 86 manual transmission (2013-2020) to a K24A block. While we have plans to develop another transmission option for high-horsepower builds, at the time of this writing the 86 transmission is the only option officially supported by us. No adapter parts are available for the 86 automatic transmissions.

## Chassis Preparation

The KPower 86 swap is bolt-in, and all wiring is plug and play. However, there are some minor chassis modifications needed to create clearance in certain critical areas. Some of the factory wiring also needs to be adjusted and/or relocated.

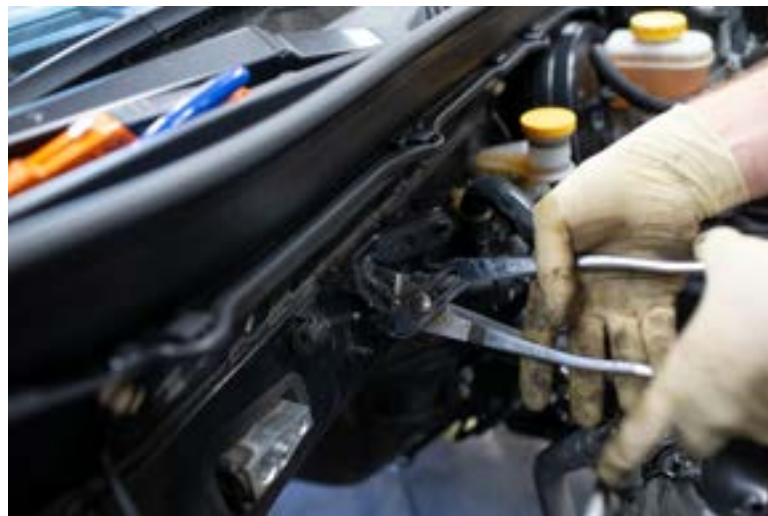
The factory engine, transmission, driveshaft, exhaust, engine wiring harness, hood, and front bumper can all be removed from the vehicle in preparation for the swap. The factory radiator and fans can stay in place. Be sure to disconnect the battery before proceeding.

This is a good time to thoroughly clean the engine bay and transmission:



We recommend removing the battery, factory A/C lines, and temporarily looping the heater core.

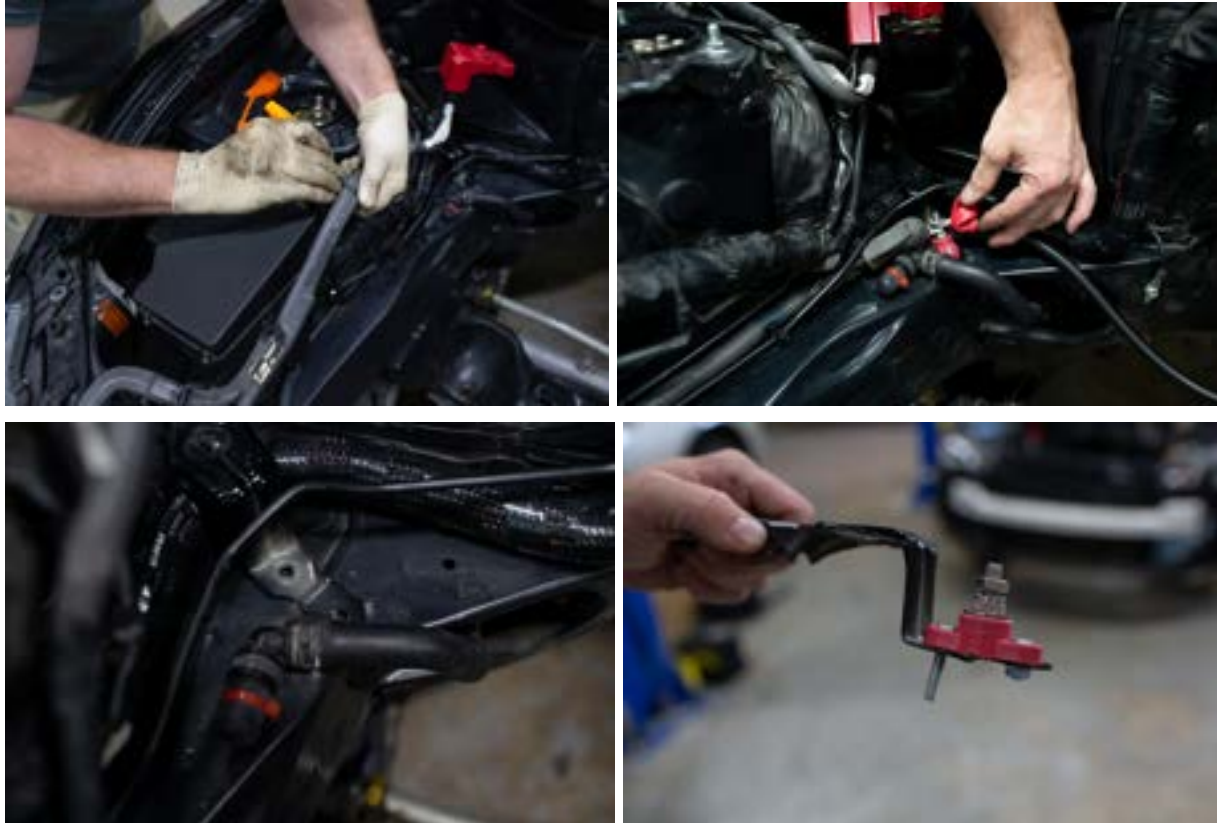
Next, we suggest removing the bracket for the factory strut braces. Our first build left the bracket in place, but we later decided that everything was significantly easier to work on without it. Just drill the spot welds and bend the bracket back and forth with some pliers to remove it.



We hit the firewall with a little touch up paint, and then used some universal plastic plugs backed

with RTV to close off the drilled holes in the firewall.

Next, some wiring cleanup is needed. The tape over the wiring on the right side of the engine bay can be split open to allow for better routing. Secure the red battery stud to the chassis using the factory battery tray bracket in the engine bay by bending it flat and bolting the battery stud to it as shown. The alternator extension can now be bolted on and covered with the boot provided.



The plastic cover wrapped around the chassis harness along the firewall can be removed.





We recommend routing that harness and 54-pin engine harness connector over to the left side of the engine bay and wrapping the harness in fresh electrical tape and some mesh loom.



The factory 86 starter solenoid will reach the K series starter on the left side of the car, but the black plastic cover needs to be cut off to fit..



In preparation for the Impreza engine mounts used with this swap, use a small sledgehammer to flatten the tabs around the engine mount provisions on the subframe. Both sides need to be done.



This area on the right side of the engine bay should also be clearanced with a sledge to allow for some additional header clearance for the engine as it moves under load.



Once again, we cleaned up the area with some touch up paint.



The fuel line cover on the left side of the bay also needs to be removed and bent to provide some additional clearance.



Since this engine conversion retains the factory 86 transmission but repositions it 4" back and 2.5" down, our new transmission mount is needed in place of the stock one, and the **right side** transmission mount bracket needs to be modified to provide some additional clearance for the relocated transmission.



We recommend marking out this area as shown and then bolting the stock trans mount bracket back into place to prevent distortion. Use a cutting wheel to make a slit along the bottom of this area, and then use your sledge to hammer it in.



Once again, we hit the modified area with some more touch up paint.



This wraps up our least favorite (but crucial) parts of the swap process!

## Preparing the Engine

This guide assumes that a K24A2 engine is being used for the swap. To begin the engine prep, put the engine on an engine stand and set cylinder 1 to top dead center (TDC). Next, remove the stock intake and exhaust manifolds, valve cover, oil pan, timing chain cover, timing chain, chain guides, tensioner, upper water neck, K24 oil pump, and oil pump chain.

If you're using a JDM K24A, also remove the alternator, tensioner, and water pump housing, as these should be replaced with their USDM counterparts.

For the particular shop car used in this guide, we are installing a built engine with a high-compression forged bottom end, 4Piston cylinder head, and aftermarket cams and valve springs, so the engine teardown isn't pictured here. This guide will cover how to install a K20 oil pump as well as a 50-degree intake cam gear, which provides some nice midrange gains on these engines.

## K20 Oil Pump Installation

Once this is all removed, flip the engine upside down in preparation for the K20 oil pump installation.



This oil pump (part #15100-PRB-A01) is required to fit our oil pan, along with the supporting oil pump chain, chain guide, windage tray, and hardware. These parts are all found on the 2002-2006 Acura RSX. Note that the oil pump needs to be machined for K24 fitment. We machine all oil pumps sold through KPower so they are ready to install as shown.



To install the pump, hang the lower timing gear from the oil pump with the chain like this:



This is the only way the gear and chain can be slipped onto the crank.



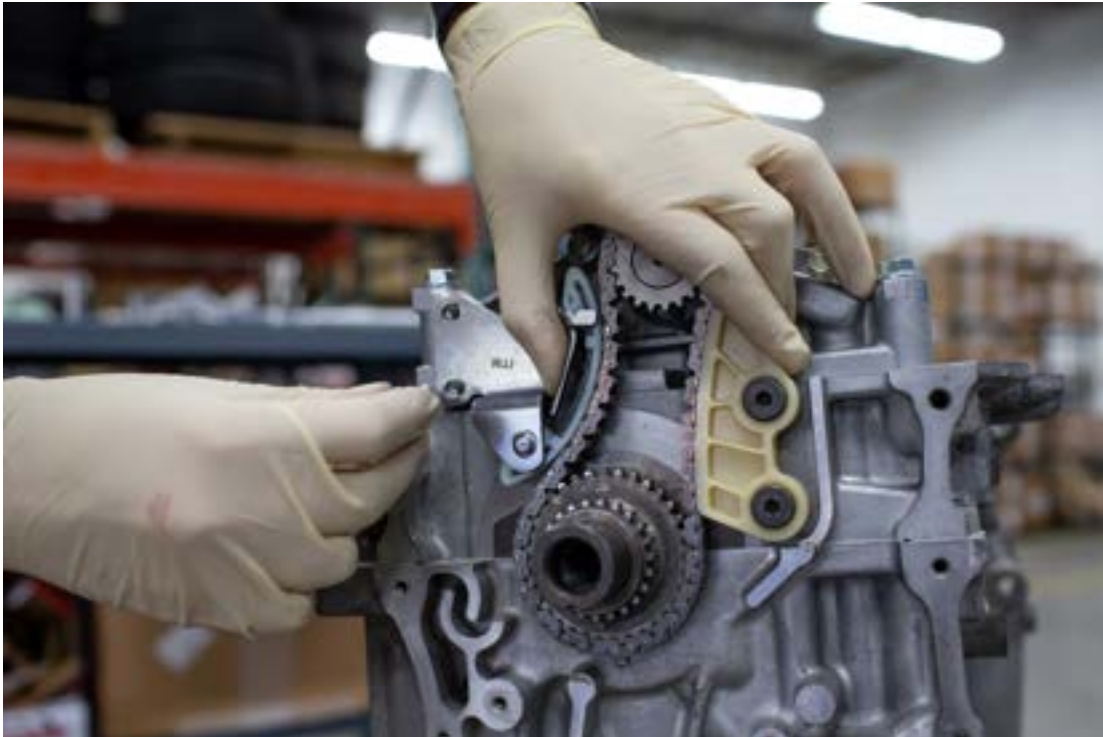
Press the dowels in the pump onto the block to lock it in place. Also, make sure that the machined area provides enough clearance between the K24 block and the pump so the pump



sits flush on the block. The oil pump chain guide can then be added using both specialty socket head bolts:



The tensioner can be reinstalled by pressing it against the chain and then adding the three mounting bolts:



All of these bolts can be torqued to 9 lbs. Note that we recommend replacing the chain guides if worn. Due to the nature of this build, every guide was replaced, but this is often not needed.

Next up is a very important step that cannot be skipped. An oil jet needs to be removed from the bottom of the block and plugged. If this isn't done, your engine will suffer from dangerously low oil pressure. Our engine already had the plug pulled, so here are a couple shots from our last build.

First, locate the oil jet:



Then use a small, sharp drill bit to drill into the center. Often, the bit will catch in the jet and it can be pulled out with the drill bit. If not, use a small wood screw to twist into the drilled hole and then use pliers to pull it out.



Finally, use the supplied M8x1.25 bolt in our oil pump hardware kit to plug this hole. We recommend putting RTV on the threads before inserting it. The hole below the jet is tapped so it will thread right in.



If you're using a different K24 block without a threaded hole, we recommend the Tractuff oil jet saddle plug:



The large 12mm head oil pump bolts can be torqued to 20 lbs, and the smaller 10mm head bolt torqued to 9 lbs.



The windage tray can be bolted on once the pump is secure. Torque to 9 ft/lb.

### **50-Degree Cam Gear Swap**

A 50-degree VTC cam gear (part 14310-RBC-003) is a no-brainer addition to a K24A2 due to the low cost and midrange gains. Our Haltech basemap is designed to work with a 50-degree gear as well.

While definitely not required, we like to use the Honda K series cam lock tool, part 07AAB-RWCA120 to lock the engine at TDC.



Once the engine is locked, just remove the original 25-degree RBB gear, and add the 50-degree RBC gear. Torque to 90 ft/lb.



## Timing the Engine

Reinstall the fixed timing chain guide on the intake side of the engine and then drape the timing chain over the cam gears. Fortunately for us, the OEM timing chains have contrasting color links to make timing these engines quite simple. The original timing chains have some dark blue links, and brand new chains have gold links. On stock engines, we typically reuse the chains, but we prefer a new (OEM only) replacement on an engine with an aftermarket valvetrain.



Up top, the two pairs of contrasting links should be placed over the marks on the gears. Down below, the single contrasting link goes over the single marked tooth on the gear.



An extra set of hands is useful for holding everything in place as you install the swinging chain tensioner back on the exhaust side, along with a new OEM timing chain tensioner (always recommended on new or used engines).

Torque the timing chain tensioner bolts to 9 ft/lb, and once you've double checked positioning, pull the pin out of the tensioner to release it.



Reinstall your upper timing chain guide and torque the two bolts to 16 ft/lb.



Once complete, spin the engine clockwise by hand for a few turns to be sure everything rotates smoothly. It's normal to hear the tensioner clicking periodically as you do this.

At this point, the K20 oil pump with the pump adapter, new oil pickup tube, K20 windage tray, and the oil pump chain/tensioners are all reassembled and tightened down, so the engine can be flipped back over. Don't forget to reinstall the pulse plate for the crank sensor, with the word "OUTHSIDE" on the outside.





## Installing the Oil Pan

Flip the engine upside down again and test fit the KPower 86 oil pan. These pans are fabricated by hand and can be tricky to sneak over the oil pickup due to the baffling. Additionally, clearance is tight between the flange and windage tray, so you may need to loosen the tray to shift it to one side or the other to get the pan to fully seat.

Also, most engines have two small studs along with the 14 bolts needed to secure the pan. Inspect the condition of these studs. If they are stripped, rusty, too short, or damaged, we recommend removing them and using bolts in every hole.

Now it's time to apply RTV to the pan and seal it up. We used to always use the OEM Hondabond RTV, but lately have had better luck sealing pans with Permatex Ultra Black. We also like the Valco Tube-Grip tool for applying it evenly.



Note that you need to circle every bolt hole for a proper seal. And if you won't be installing the timing chain cover immediately, it's not a bad idea to wait to apply RTV to the front section of the pan, as that can be applied once the engine is flipped back over before the timing cover is installed.



Once the pan is flush on the engine, thread in all of the supplied new oil pan bolts, and torque to

9 ft/lb. Be sure to start on the sides in the middle and tighten back and forth as you move to the front and back of the pan. You'll need an open-ended 10mm wrench for some of the holes due to the location of the kickout on the side of the pan.

## Installing the Chain Cover

The timing chain cover is also sealed with RTV. We recommend replacing the O ring in the back of the cover, as a damaged O-ring will result in low oil pressure.

Put RTV on the back of the cover like this:



Be sure to apply RTV to the front edge of the oil pan if you haven't already done so. When you're ready to install, line it up on the side of the engine and use the two speciality shoulder bolts in the bottom corner holes.



Thread in the remaining bolts loosely, then install the three remaining oil pan bolts from the bottom before torquing all 10mm head bolts to 9 ft/lb.



We recommend installing M10x1.25 flange bolts in the three larger holes in the cover normally used for the FWD engine mount bracket. Without these bolts in place, the cover may leak.

## Installing Engine Accessories

If you're using a JDM engine and building a car in the U.S., you'll want to remove the water pump housing and replace it with a USDM housing. The JDM alternators aren't available here, so building your car around a 15+ year old alternator isn't the best long-term plan. The USDM housing is pictured on the [left](#), and the JDM housing on the [right](#):



Be sure to replace the O-ring on the back as well. Once this is completed, all accessories bolt on like stock.



Torque the crank pulley to 180 ft/lb. Note the EP3 idler pulley up top, replacing the factory K24 power steering pump.

A factory A/C compressor bolts to the factory bracket, and belt 7PK1680 can be installed as shown. If you're using our engine wiring harness, you must use an A/C compressor from a 2006-2008 Acura TSX, or the connector will not fit.

If you're not running A/C, use belt 7PK1320 and route like this:



Use a 14mm socket and breaker bar to pull the auto tensioner back to slip the belt into place.

Before the valve cover is reinstalled, we always recommend replacing the gasket and spark plug tube seals and doing a valve lash on any used engine. Intake valve lash should be .007" and exhaust should be .008". Fresh spark plugs can also be installed now. For naturally aspirated engines, we suggest NGK 2667 plugs (BKR7EIX).

## Upper Coolant Neck

Since the stock upper coolant neck points the upper radiator hose inlet straight into the firewall, you need to use a custom upper coolant neck that points the inlet towards the right side of the engine bay.

To install the new coolant neck, remove the factory part and inspect the gasket. Usually they can be reused, but if yours is damaged and flaking apart, replace it with part 18714-RAA-A01.

The engine coolant temperature sensor (ECT) also needs to be relocated from the side of the head to the top of the coolant neck. To do this, unthread it from the head and install the supplied bolt and O-ring in its place.



The coolant neck can now be installed with the gasket using the supplied socket head bolts.



The sensor can then be threaded into the top of the coolant neck.



Notice that we leave the cam sensors out of the back of the head, as they can be easily damaged when the engine is installed into the chassis.

## Mating the Engine and Transmission

Now that the engine is prepped, it's time to lower it onto the ground to get ready to mate the engine and transmission together.

### Preparing the Transmission

Now is the time to refresh any components in your transmission before installing it. At a minimum, inspect the clutch fork and pivot pin, and install a new 2017+ OEM release bearing.





If you're looking for the utmost reliability, now is a great time to upgrade to the Verus Engineering forged clutch fork and billet pivot pin, which we've done on this car.



We also recommend cleaning up the bellhousing and removing the stock shifter carrier, shift lever, and selector rod off the back.

## Engine Mounts

The engine mount brackets can be bolted to the engine. Installation is straightforward with the supplied hardware. The bolts we provide are all the maximum length that will fit in the threaded holes on the block, so make sure you check hole depths and put the bolts in the correct locations.



Since powder coating compresses when tightened down, we recommend rechecking the torque after 100 miles of driving. We also recommend paint marking the bolts so you'll be able to tell if any of them have backed out. Torque the M10 bolts to 35 ft/lb and the M12 bolts to 45 ft/lb.



## Adapter Plate

Our patent pending K to 86 transmission adapter plate allows the transmission to be bolted up like stock. Our plate's unique design has a cutout above the starter that allows precisely enough clearance for the factory 86 slave cylinder.

To install, first inspect the two K24 dowel pins. If they are damaged, replace them with part 90701-PW5-000. If your engine came from a donor car equipped with a manual transmission, you'll also need to install these shorter automatic dowel pins.

Assuming the dowels are in good condition, the plate will lock right on to the engine block. Use the M12 socket head bolts on the front of the plate to secure it in place.



Two additional M12 flange bolts thread in from the back on the exhaust side of the engine. The final M12 bolt on the intake side is threaded through the starter and into the plate, so hold off on that one for now.

## Flywheel and Clutch

Next, bolt the flywheel to the engine. You'll need OEM K20 manual transmission flywheel bolts, part 90011-PNA-B00. No other bolts will work. You will also need a 17mm twelve point socket,  $\frac{3}{8}$ " drive, to carefully tighten down all bolts. Torque to 90 ft/lb.

Any 2013-2020 86 clutch kit can be used with our flywheel, as long as it's a clutch kit that is designed to pair with an OEM flywheel. We like the Sachs Sport clutches for motorsports applications, and a stock Exedy clutch for street cars.

Use the supplied alignment tool to hold the disc in place.



Take care to keep the disc as centered as possible when bolting down the pressure plate, as the plastic alignment tools have pretty loose tolerances and need to be pressed forward to fully center the disc.



Use the factory 86 pressure plate bolts and torque to 20 ft/lb. Any grade 10.9 m8x1.25 bolts can also be used.

## Starter

The starter can now be bolted up using the final M12 bolt in the adapter plate hardware kit, as well as the specialty starter bolt that probably came attached to your used engine. **Note that you MUST use a K20 starter (2002-2006 RSX).** The K20 starter (left) has a more tapered tip compared to the K24 starter (right).



A K24 starter digs into the bellhousing and damages it. Because of this, we only recommend using K20 starters, and the starter cutout in our adapter plate is undersized so a K24 starter intentionally won't fit.

## **Bolting Up The Transmission**

The transmission can now be bolted to the engine. Use the OEM 86 transmission dowel pins, or use the new dowels included with our hardware kit for your convenience.



Line up your input shaft with the clutch and pilot bearing. When everything is perfectly aligned, the transmission should slide right on without any force. If the transmission will not align, it's possible that your clutch disc is not perfectly centered, and you may need to remove the pressure plate, recenter it, and try again. An extra set of hands goes a long way for this process.

Use the remaining seven M10 70mm bolts to bolt down the transmission, torquing bolts to 35 ft/lb. Be sure to install the supplied 86 starter blockoff plate when installing these two bolts:



## Installing the Assembled Drivetrain

Congratulations, your modified drivetrain is now ready to install into the chassis! Once again, having someone to assist will make this process much easier. Since we prefer to attach the engine and transmission outside the vehicle, we always shoehorn the drivetrain in from the top. Front bumper removal is key here.



Using a leveler on your hoist will make things a lot easier, and we also like to use a ratchet strap so we have a third adjustment point to give us greater control over the position and angle.



Take care to not damage the firewall, cowl, and heater core inlets as you work the engine into position.





Once the engine is more or less in position, the rubber mount pads can be slipped into place on each side.





Thread the nuts on loosely to keep the studs in place. Once everything is in position, slide the engine as far to the left side of the engine bay as possible, and then tighten all of the nylock nuts, and paint mark them.





To install the transmission mount, we like to use a 2x4 between the valve cover and firewall to keep the drivetrain from falling backwards too far.



Underneath the vehicle, bolt the stock transmission mount into place with the Whiteline transmission mount insert installed (see the supplied instructions for details).



The transmission mount bracket can now be bolted on just like stock using all of the supplied hardware.



Once all bolts are tightened down, inspect the drivetrain position and make sure nothing is touching on the subframe or chassis.

The right-side transmission mount stud needs to be cut short to create enough clearance for the 3" exhaust, so now is a good time to do that as well.



## Engine Bay Wiring and Plumbing

Now that the engine and transmission are secured in the car, it's time to add wiring, remaining accessories, and all plumbing.

First, we'll connect some wiring and plumbing located underneath the intake manifold, as it's much easier to access before the manifold is installed.

### Starter Wiring

The starter battery cable from the 86 will reach the K20 starter, but the eyelet needs to be flattened to fit. It's easy to do with some pliers and vice grips.



The starter solenoid wire that you modified will fit the K starter solenoid, but we like to put a piece of heat shrink tubing over it before installing it.





Your KPower 86 engine wiring harness can now be connected to the 54-pin firewall connector. The knock sensor and A/C compressor can be hooked up, too. The red alternator extension cable can also be attached to the alternator.

**Lastly, be sure to connect the main engine ground to the block above the starter.** The stock 86 ground cable works fine. There is also a **second ground** on the transmission that needs to be attached as well.

## Heater Hoses

You may have noticed that our upper coolant neck deletes the factory heater port. Since clearance is so tight against the firewall, we opted to route the heater core in line with the thermostat bypass hose that normally connects the thermostat housing with the barbed inlet on the bottom of the intake manifold. If you're not running heat, the bypass hose can be installed like stock into the bottom of our intake manifold with the supplied 90-degree fitting.

Assuming you are retaining heat, the heater core inlets need to be gently bent to the left side of the bay to provide enough room to attach the hoses. We found the best way to do that was to put a  $\frac{3}{8}$ " socket extension inside and gently pull to the side.



The hard black heater pipe already should have been removed from the K24 thermostat. This opening gets plugged with the Hybrid Racing thermostat plug and bracket.

Our 86 heater kit includes two OEM Honda hoses that are the exact shape needed. The supplied  $\frac{5}{8}$ " barbed heater hose adapter and clamps are used to extend the bypass hose to the right heater port. The bypass hose needs to be trimmed slightly to fit. The second U-shaped hose can be connected to the heater core now, and then attached to the bottom of the intake manifold once installed.





Once the intake side of the engine looks like this, you're ready to install the intake manifold.



### **Intake Manifold, Throttle Body, and Header**

The intake manifold installs like stock. We recommend only using an OEM style steel gasket, as the plastic thermal gaskets are too soft and can be problematic. Since our manifold is used for numerous applications, there is a provision for an idle air control valve (IACV) on the bottom of the manifold. You were supplied with an IACV blockoff plate, four bolts, and gasket, since drive-by-wire vehicles do not use this feature.



Torque all of the supplied intake manifold bolts to 16 ft/lb. This is important, since over-torqued manifold bolts are prone to breaking.

For mild naturally-aspirated swaps and turbo builds, we recommend using the stock 86 throttle body. Remove it from your FA20 and cut the two coolant barbs off of it. They usually clean up pretty nicely with a scotch-brite pad.



Next, bolt on the 86 throttle body adapter with the supplied hardware and gasket. You can also see the K24 MAP sensor has been installed in the intake manifold in this picture.



When bolting up the throttle body, be sure to use the supplied rubber gasket, and also install the nylon washers behind the bolts heads. We recommend using some blue Loctite on these bolts, torquing to 9 ft/lb, and paint marking them. The engine harness can also be plugged in.



The header also bolts on like stock. Be sure to use an OEM style steel gasket.



## Engine Wiring Harness

Now that the manifold is attached, the rest of the wiring harness can be connected to the engine. Due to the precise lengths of the wires and the different connector styles, this should be fairly self-explanatory. You'll want to install the cam sensors at this time as well. Use the supplied clamps to secure the harness to the back of the engine on the areas where the harness has gray tape.



Our engine harness uses an injector sub-harness to make any injector installation possible without any cutting or splicing. The default option for our harness is for OEM K series injectors, with other options available upon request.

Bolt on the injectors of your choice, as well as the KPower fuel rail and 5/16" quick disconnect fitting. Be sure to use the two OEM plastic spacers that go beneath the fuel rail.



## Radiator Hoses

If you ordered our Complete K24 86 Package, you received two 1.25" to 1.5" radiator hose adapters, as well as some clamps. You'll be using these adapters to connect the stock 86 upper and lower hoses to two new 1.25" hoses. For the lower hose, we use **Dayco 71718**. Trim a few inches of the stock lower hose and connect it to the new hose.





For the upper hose, we use **Gates 23383**. Cut it to length like this:





Install the second barbed adapter into the stock upper hose before installing your new L-shaped section. Use the supplied clamps to tighten everything down.



We also recommend installing some heat shielding over the upper hose, as it passes near the header.



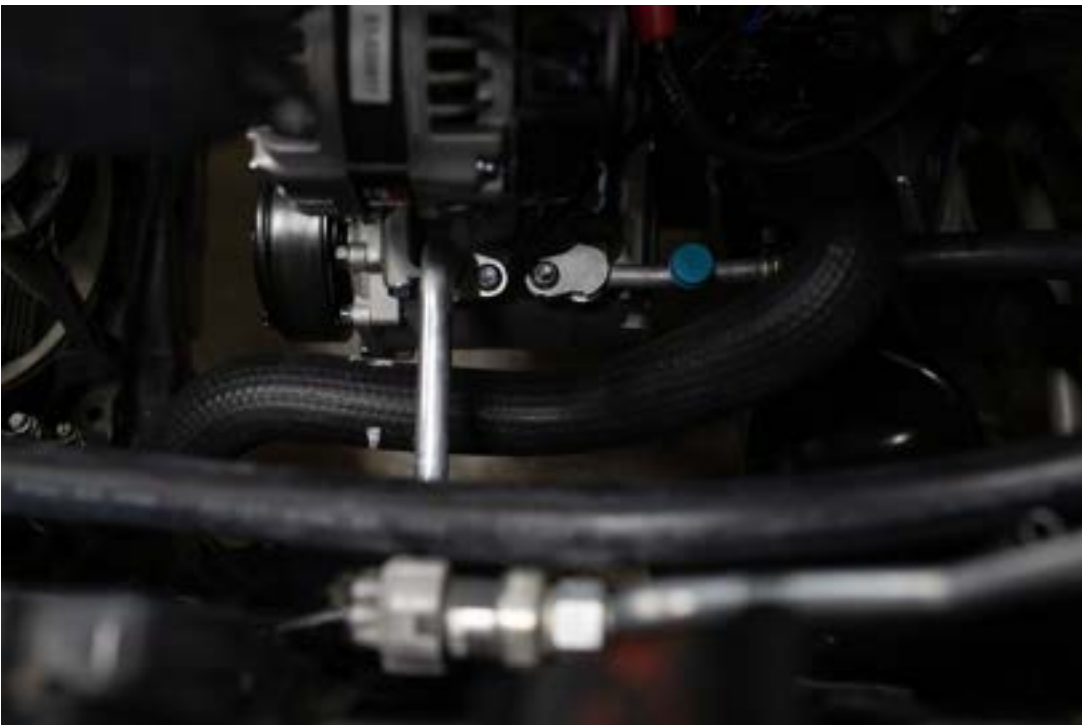
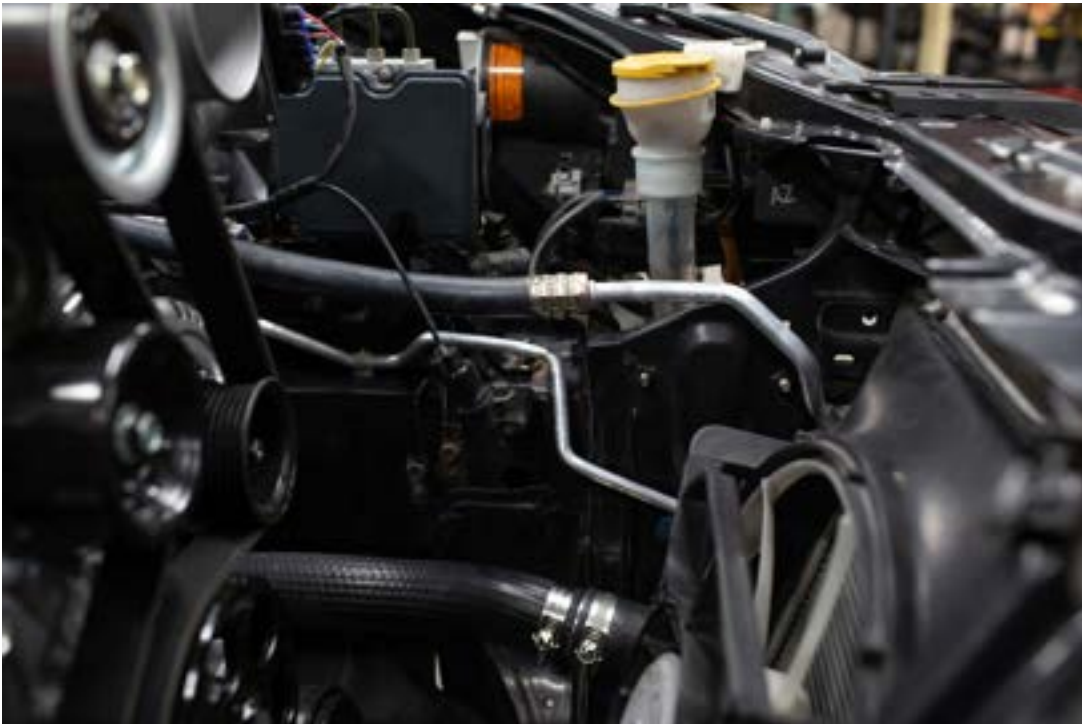


## Air Conditioning Lines

Our custom A/C lines make installation extremely simple. The upper lines attach to the 86 evaporator and route over the top of the engine to keep the lines away from interfering with the exhaust or a possible turbo setup.



The lines continue down the left side of the engine bay and have a provision for the stock 86 pressure switch, condenser, and the K series compressor.





## Fuel System (updated Fall 2022)

For more naturally-aspirated builds running pump gas, our fuel system is a very straightforward and affordable solution. Connect the 5/16" quick-disconnect 90-degree fitting to the fuel rail, and clamp the other end to the fuel hard line that's closest to the front of the vehicle. The other two hard lines can be capped or removed from the vehicle.



A single zip tie around the fuel hose and A/C lines keeps everything in place. Also note that the factory 86 brake booster hose with internal check valve can be installed now.

Since the FA20 uses eight injectors, there are two fuel feed lines that run from the rear of the car to the front. You'll be plugging one of them. In front of the left rear wheel, locate these fuel lines:



Disconnect the unneeded fuel line and use the aluminum fuel line plug in our fuel kit to plug it.





If you're not removing the extra line from the car, secure it in place with a zip tie.



The fuel kit also includes a couple parts to delete the OEM fuel pump ECU and replace it with a traditional relay setup. This improvement in design (Fall 2022) will allow the pump to prime for 5 seconds when the ECU is first turned on, instead of it running continuously. The fuel pump ECU is located behind the right side rear plastic trim inside the cabin. Pull the trim back and look for this:



Disconnect the connector and use the supplied mini screwdriver to de-pin the connector. Unfortunately, the mating connector for the fuel pump ECU isn't available for purchase, so this is the cleanest way to bypass the ECU without cutting the chassis harness.

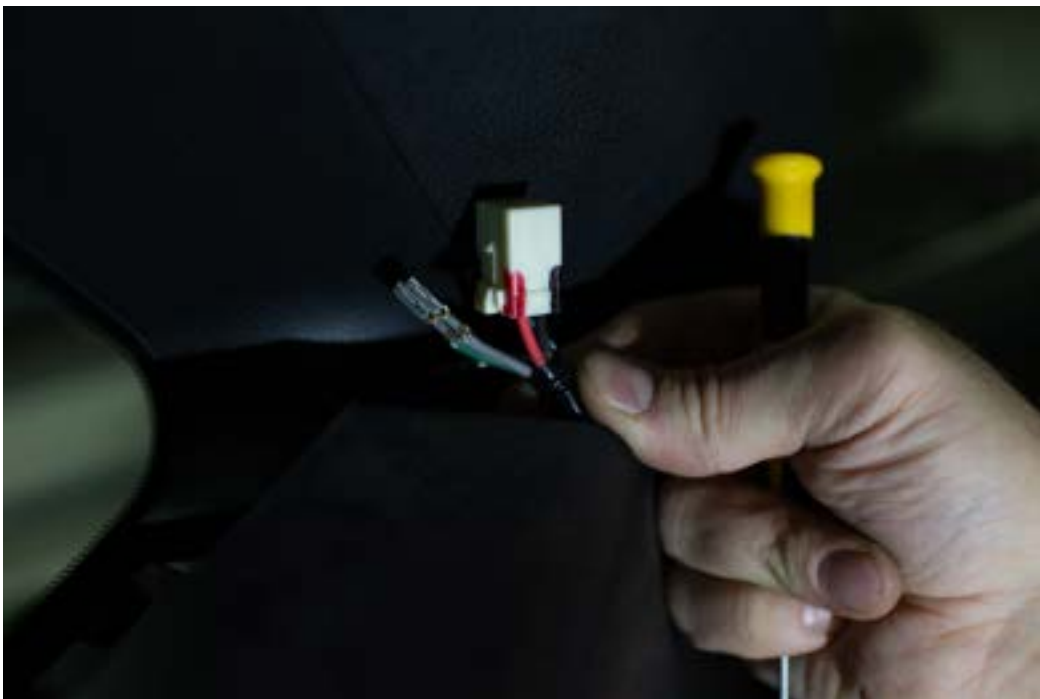


Once de-pinned, the connector should look like this:





While the connector we supply looks different, it uses the exact same terminals. Because of this, the fuel pump ECU wires can be snapped into the new connector. Follow the color markings on the new connector to ensure that **all five required wires** are being matched correctly.





Once all [five](#) terminals have been snapped into the new connector, [you can connect the new relay block to the chassis harness.](#)



The fuel pump ECU can be left in the vehicle or removed.

## Shifter Installation

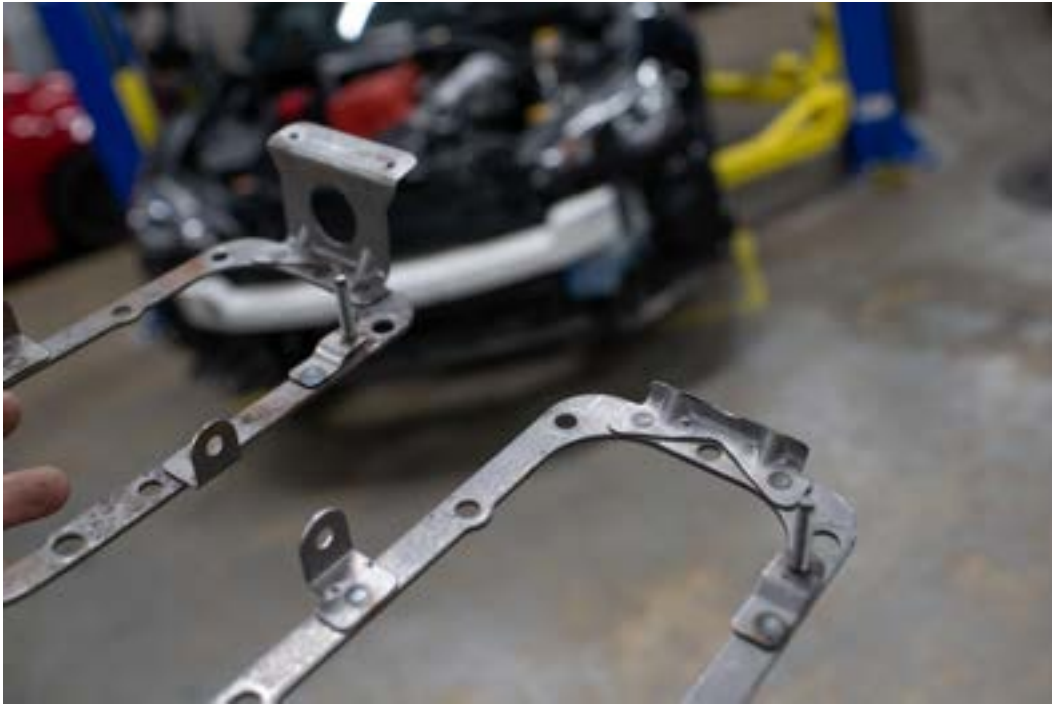
Since the transmission position has been altered significantly, we offer some components to retain the stock shift lever, and thus the excellent shifter feel.

Our setup deletes the shifter carrier and rear bushing, and replaces it with a solid mounted shifter plate that accepts the stock shifter. Note that the Whiteline transmission mount insert must be used with this solid mounted setup.

Bolt the shifter to the shifter plate, and then remove the stock shifter boot, lower rubber boot, and steel frame. The shifter plate can then be slipped through the opening and lined up on the transmission tunnel.



Next, cut the rear bracket off of the steel frame. (Left is before, right is after)



The stock shift boot and frame can now be bolted back on top of the shifter plate for a clean, factory-like installation.



Eventually you'll reinstall the outer shift boot to complete the installation, but you can keep it opened up for now, as the Haltech wideband O2 sensor will be routed through the opening in the plate to the exhaust down below.

Note that the reverse lockout guide may need to be adjusted side to side to set the shifter up for smooth 1-2 shifts. Some trial and error is typically needed to get it perfect.

Also, note that it is normal for the shifter to sit roughly 1" lower than stock. Since the transmission is now lower than stock, the shifter is intentionally positioned like this to keep the angle of the selector rod as straight as possible, which keeps shifter effort to a minimum. If you prefer a taller shifter, a taller aftermarket shift knob is an easy solution.

From below the vehicle, the selector rod can now be attached to the back of the transmission and shift lever using the supplied pins and retaining clips.



Once the shifter installation is completed, the KPower one-piece aluminum driveshaft can be slipped into the back of the transmission and bolted to the differential.

# Intake and Exhaust

## Intake Piping

Our 3" intake pipe and filter installs exactly how it looks, with the supplied coupler and clamps.



Loosen the upper radiator support bracket to slip the pipe underneath, and attach both intake brackets onto the support.

The intake pipe includes a hole and rubber grommet for the stock K24A intake air temperature sensor (IAT), and our harness also includes a connector for it.

The remaining bung on the pipe is a  $\frac{3}{8}$ " NPT bung. If you're installing an aftermarket catch can, this can be blocked off with the supplied plug. If you're running an OEM style breather configuration, use this bung to run a hose from the valve cover vent to a barbed  $\frac{3}{8}$ " NPT to  $\frac{5}{8}$ " barbed fitting.

## Exhaust

Our header also includes a 3" midpipe that terminates in a 3" two-bolt universal flange that should be the same as many aftermarket 3" 86 exhausts, giving users a range of choices.

Before installing the midpipe on the header, cut off the stud on the transmission mount on the right side.



Next, install the supplied exhaust hanger bracket. This hanger is absolutely needed to eliminate premature header and/or exhaust cracking. Keep the bolts loose until the midpipe is attached.





Before installing the midpipe, the wideband needs to be fed through the opening in the shifter plate. Pull back the shifter boot to expose the hole and pass the sensor through.





The sensor needs to be threaded into the midpipe below the car, and then bolted up to the header with the supplied hardware. The rubber hanger can now be slipped into place.





**It's very important that a mesh flex pipe is installed in your 3" exhaust system, ideally as close to the midpipe as possible.** Many aftermarket exhausts already include this, but all custom exhausts need to have one as well. Running without a flex may cause your header to crack. We like Vibrant part #61006.

## Under Dash ECU and Wideband Wiring

Our plug-and-play wiring solution adapts a Haltech Elite 1500 ECU to your vehicle to control all engine functions, as well as all CANbus chassis protocols. To install, remove the glove box and the plastic trim behind it, and locate the stock ECU inside a black box. It's located on the right side under the dash.



You'll need to move this other control module out of the way to access the engine ECU.



The ECU is attached to a metal bracket.

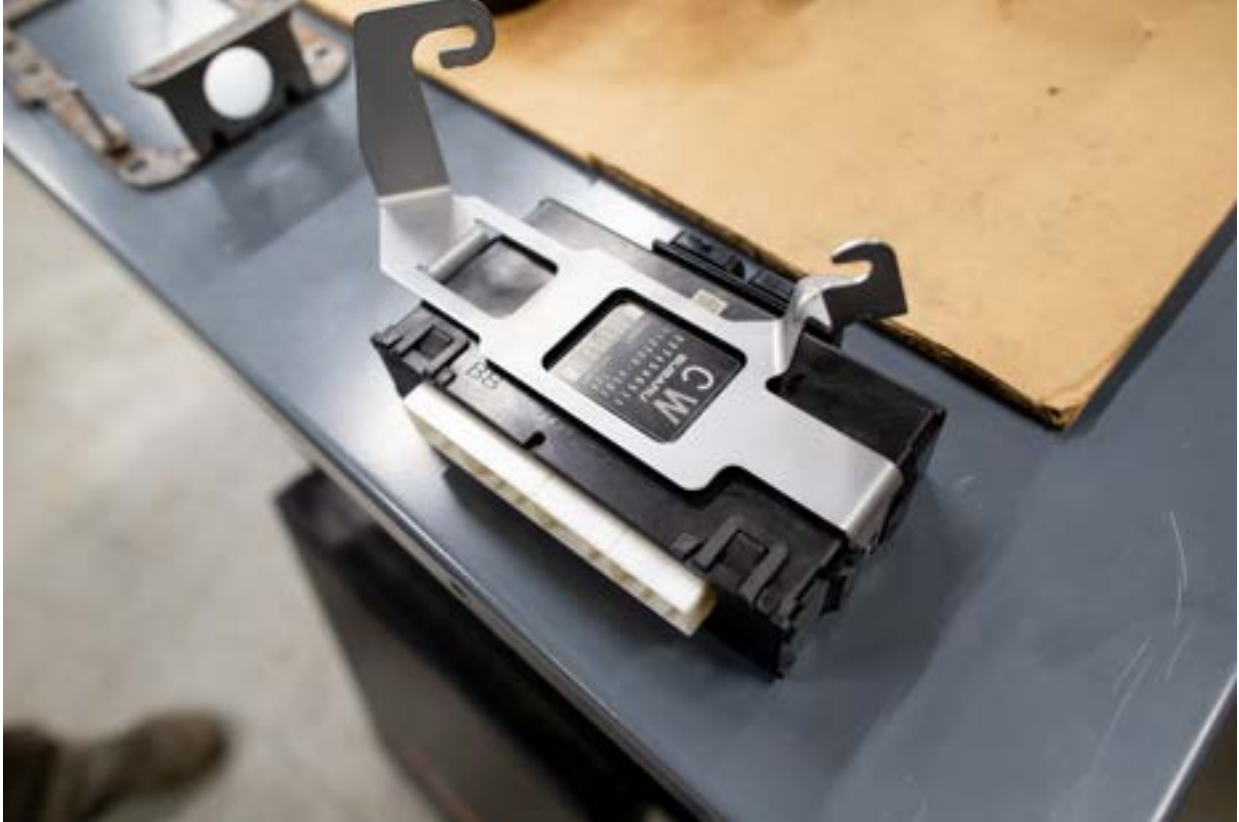


The plastic box needs to be opened up so the stock ECU board can be removed and replaced with our ECU jumper board.



The back side of the box needs to be cut open so the two additional connectors can be accessed.





Once the board is installed in the ECU box, reinstall it under the dash using the same metal bracket. It's easiest to attach the jumper harness before the ECU board is bolted back in. Attach it as shown, with the 4-pin Deutsch connector opposite from the ECU jumper board.





The Haltech ECU and CAN wideband controller can be secured in a variety of ways, but having the ECU accessible is key. They can be installed in the glove box, or zip tied to the same bracket. We recommend leaving the USB cord attached to the ECU and rolled up in the glove box for easy access.

The four-pin Deutsch connector on the ECU jumper harness plugs directly into the ECU. The CAN wideband controller also connects to the ECU jumper harness on the other end.





It's difficult to photograph the routing of the wiring inside the cabin, so here is how the wideband and controller connect. The four-pin Deutsch connector shown is what connects to the ECU jumper harness.



The ECU can be secured here:





Feed the USB cable through the opening pictured here. The wideband controller can be neatly zip tied inside the dash as well. Once complete, reinstall the glove box and leave the USB cable inside.

## Initial Startup Instructions

Once your factory undertrays are reinstalled, the assembly portion of the project is complete!



### Haltech Basemap Setup

If you purchased a Haltech Elite 1500 as a part of a KPower 86 swap package, it was shipped with a flash drive. This flash drive has two basemap designed for a 2004-2008 K24A2 (or JDM K24A) engine with a 50-degree VTC gear. Once the ECU is plugged into the car, use the included USB cable to upload the appropriate version of the tune to your ECU. One is pre-configured for a push button start, and the other for a manual key.

You may need to update the Haltech firmware as well. Once that's done, the final thing you'll need to do is calibrate the drive-by-wire throttle pedal and throttle body. To do this, follow the instructions on the [Main Setup page](#) (gear icon), under "Drive-By-Wire." The software will walk you through the calibration procedure. The tune can then be re-uploaded in preparation for a first start.

## Priming the Engine

Extra care should be taken to start up your car for the first time. First, add approximately 6.5 quarts of oil to the engine, or until the oil level reaches the top dipstick dot. For stock engines, we recommend a high quality 5w30 or 10w30 synthetic.

The battery can also be reconnected at this time.

Before the first start up, disconnect all four injector connectors and attempt to start the car several times to build oil pressure. Try to crank the starter for at least 30 seconds. Also take this opportunity to inspect your fuel rail, injectors, and lines, and make sure there are no leaks.

Once this is done, reconnect the injectors. If you have done everything correctly, the engine should fire right up when you hit the engine start button, just like stock.

## Bleeding the Cooling System

K series engines are notorious for being a bit difficult to burp. However, once it's done you shouldn't have to worry about it for quite some time.

For best results, jack the front of the car up in the air as high as possible, and remove the radiator cap. We suggest using a Lisle funnel and securing it to the radiator fill port.

Fill the system with as much coolant as it will take, and then start the engine. You'll likely need to massage the radiator hoses to get the coolant flowing through them. Don't be afraid to let the engine get hot. If it stays around 220 F for a minute, shut off the engine for a minute and restart it. It often takes one or two engine restarts to get all of the air out of the system. Also, giving the engine some RPM will often get things moving.

Don't stop until both the upper and lower hoses are very hot to the touch, not just warm. Make sure the fan turns on and then shuts off. Once complete, cap off the radiator and lower the car back to the ground.

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

## Dyno Tuning

While our basemap is a great starting point for stock K24A engines, we always recommend a full dyno tune by a qualified K series tuner. An immediate dyno tune is mandatory if there are any engine modifications beyond a 50-degree VTC gear.

## Future Products

We have a couple additional accessories that will be available soon for the KPower 86 swap. We hope to begin production on our front upper strut bar soon. It's specifically designed to clear the taller K series engine.

Additionally, our custom valve cover with Radium Engineering banjo fittings have just been added to our website, as pictured on the vehicle in this guide. They are available in wrinkle red and black finishes.



High-horsepower products for forced induction builds are also on the horizon, including a bulletproof transmission upgrade, and turbo components.

## Useful Part Numbers

Here's a handy reference of OEM or OEM replacement parts that you may want or need for your project:

### **OEM Honda Parts:**

15100-PRB-A01 K20 oil pump

14310-RBC-003 50-degree VTC gear

18714-RAA-A01 upper coolant neck gasket  
19200-RAA-A01 K24A water pump  
19410-RAA-A00 USDM K24A water pump housing  
19322-PCX-003 water pump housing O-ring  
91214-RNB-A01 K24A rear main seal  
31190-RRR-A00 EP3 pulley  
31175-PRA-000 EP3 pulley bracket  
31185-PCX-003 EP3 bearing cover  
90031-PRA-000 EP3 pulley bolt  
90011-PNA-B00 K series manual flywheel bolt  
14510-PRB-A01 timing chain tensioner  
90701-PW5-000 engine dowel

**Recommended Aftermarket Parts (Rockauto.com):**

Denso 2800367 K20 remanufactured starter  
Denso 2100609 USDM K24 alternator  
Continental 49341 auto belt tensioner  
GPD 6512348 A/C compressor  
Gates 23383 upper radiator hose  
Dayco 71718 lower radiator hose

**Congratulations on successfully converting your 86 to K series power! If you have any feedback on this installation guide, please email us at [info@kpowerindustries.com](mailto:info@kpowerindustries.com).**

## Commonly Used K series Torque Specs

|                   |           |
|-------------------|-----------|
| Valve cover       | 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 | 9 lb-ft   |
| Crank pulley      | 181 lb-ft |
| Windage tray      | 9 lb-ft   |
| Oil pump 8x1.25   | 16 lb-ft  |
| Oil pump 6x1.00   | 9 lb-ft   |
| Oil pan           | 9 lb-ft   |
| Flywheel          | 90 lb-ft  |
| Pressure plate    | 20 lb-ft  |