Dynojet Power Vision PV3
Instructions for Use with HAMMER Engine Kits
Step-by-Step guide

Introduction

The PV3 is new flash type tuner from Dynojet, capable of reflashing the Delphi ECM found in most Harley Davidson fuel injected models. It's a lower cost alternative to the PV1/PV2 versions of the Power Vision.

As of Fall 2022, the PV3 supports Auto Tune Basic, and therefore HAMMER PERFORMANCE has started supporting it for use with our engine kits. Support of Auto Tune Pro and Target Tune are said to be coming.

This document is your step-by step guide to tuning your bike with your new HAMMER PERFORMANCE engine kit using an PV3. It covers the updating of the PV3's firmware, retrieving the bike's original tune and sending it to us receiving and flashing the base tune we will provide, and finally the Auto Tune process.

VERY IMPORTANT!

Do not, under any circumstances, start your bike with it's new engine kit until your new base tune is in place! Engine damage occurs very quickly when people make this mistake. This type of engine damage is not covered by warranty because it does not represent a defect in the kit.

PV3 Buttons

Familiarize yourself with the button names on the drawing below, as this document will refer to them using these names.
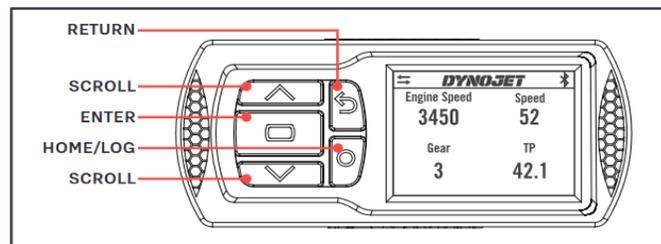
Update the PV3's Firmware

The very first thing you need to do, before anything else, is to update your PV3's firmware to the latest version. This consists of connecting and powering up your PV3 with a computer, entering USB mode if it doesn't happen automatically, downloading the latest firmware from Dynojet's web site and placing it on the PV3, and performing the actual update operation.

There are at least three different ways to do this. The method we describe here was chosen because in our opinion, it's the easiest and most reliable. It can be done entirely without any special program or application on your PC, which means it can be done on your Apple or your Android, so long as your device has a USB port.

Initial Power Up, Enter USB MODE

This section will describe the initial steps of powering up your PV3 and putting it into USB mode so that you can update to the latest firmware. Depending on the firmware your PV3 comes, it may or may not power up in USB mode initially.

Using the provided cable, plug your PV3 into an available USB slot on your computer. If it comes up in USB mode, you'll get the following message:

If your PV3 comes up with the above message, you're golden. Skip down to the Downloading Firmware section on page 6.

If your PV3 instead comes up with the above message, ignore what it's telling you to do. Instead, press the RETURN button and continue with the following steps

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After pressing RETURN, the display will look like the above. Now press the ENTER button.

You will now be at the MAIN MENU as shown above. Next, use the SCROLL down button to select DEVICE TOOLS.

When DEVICE TOOLS is selected as shown above, press the ENTER button.

You're now in the DEVICE TOOLS menu as shown above. Next, use the SCROLL DOWN button to select USB MODE.

When USB MODE is selected as shown above, press the ENTER button. You will now enter USB mode as shown below:

<u>Download the New Firmware to the PV3</u>

When in USB MODE, the PV3 appears as a USB thumb drive on your computer, with the name POWERVISION.
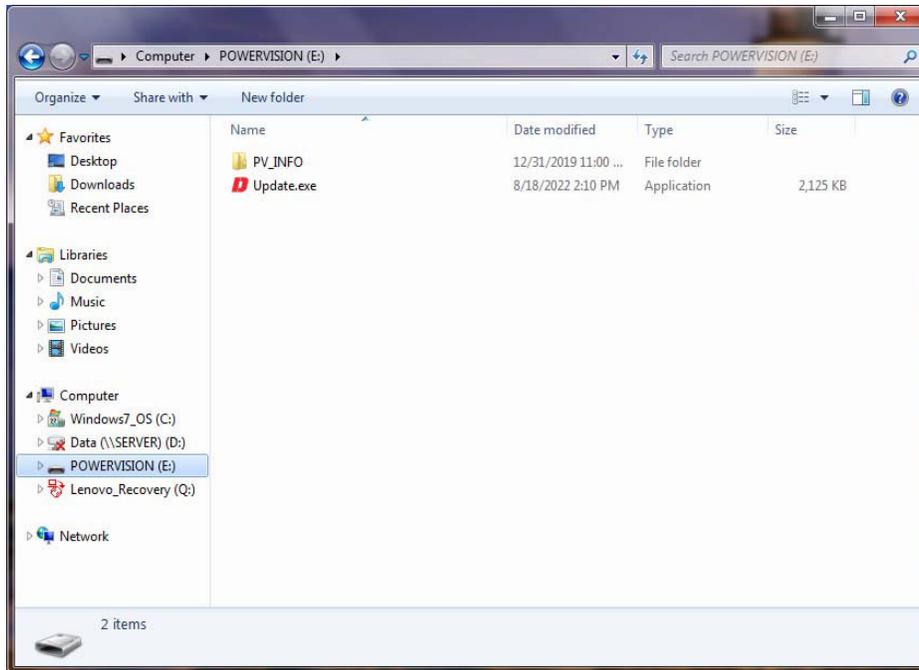
In the above example, the PV3 is shown as the E: drive, but this drive letter may vary depending on your computer.

The contents of the PV3 drive will initially be the Update.exe program and the PV_INFO folder as shown. For this procedure, we will not be using the Update.exe program.

Instead, open a web browser on the same computer and go to
https://www.dynojet.com/downloads/power-vision-3/
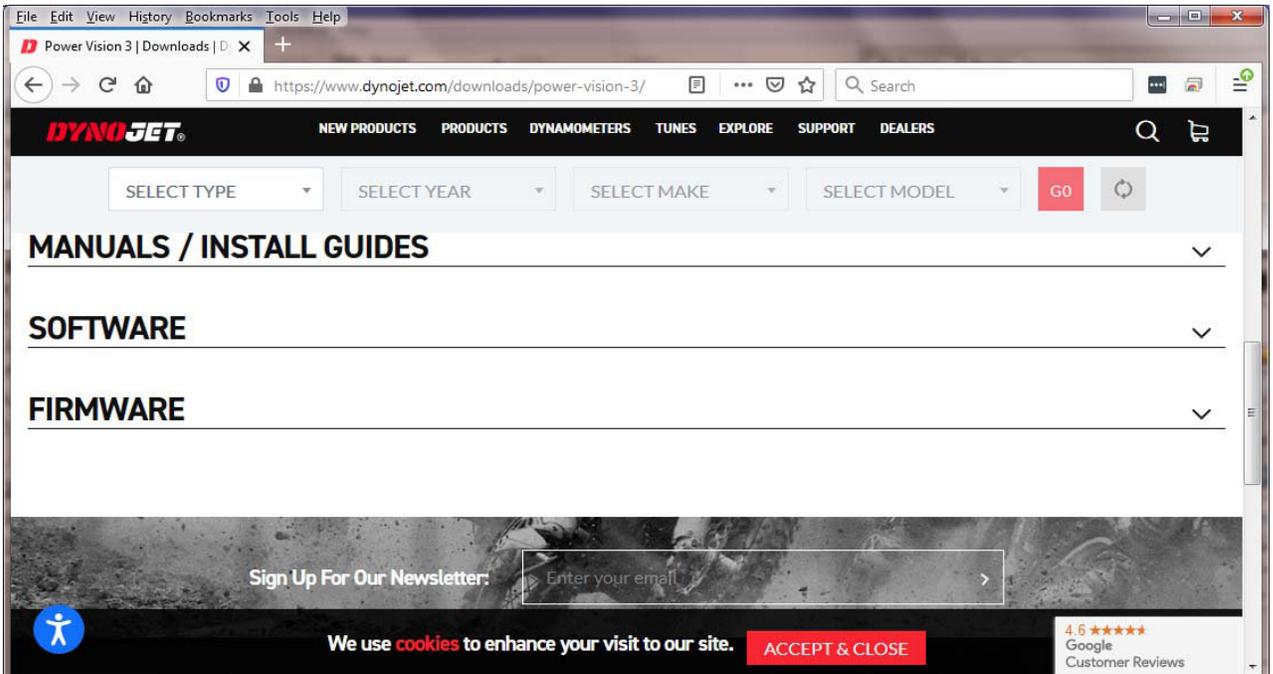
Scroll down and then expand the "FIRMWARE" section

FIRMWARE			
DESCRIPTION	SIZE	UPDATED	DOWNLOAD
Power Vision 3 Firmware for Can-Am - Version 4.12.8299.20956	1.52 MB	Jan 17, 2022	
Power Vision 3 Firmware for Honda - Version 5.16.8297.41698	1.56 MB	Oct 28, 2021	
Power Vision 3 Firmware for Indian - Version2.15.8293.23438	1.51 MB	Jan 17, 2022	
Power Vision 3 Firmware for Polaris - Version 2.15.8293.23438	1.51 MB	Jan 17, 2022	
Power Vision 3 Firmware for Yamaha - Version 6.13.8297.42280	1.48 MB	Oct 28, 2021	
Power Vision 3 Firmware for Kawasaki - Version 7.6.8297.40394	1.51 MB	Mar 10, 2022	
Power Vision 3 Firmware for Harley-Davidson - Version 3.9.8297.19316	2.61 MB	Sep 23, 2022	

Now click on the download icon to the right of "Power Vision 3 Firmware for Harley-Davidson" as shown above.

The goal here is to save the new firmware file on the PV3, in the root directory. Different web browsers handle downloading in different ways, and in some web browsers, downloading can be configured.
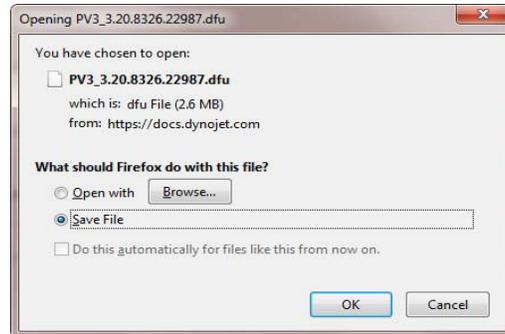
In the above example, the browser has given the option of where to save the new firmware file. In this case, simply click "OK ...
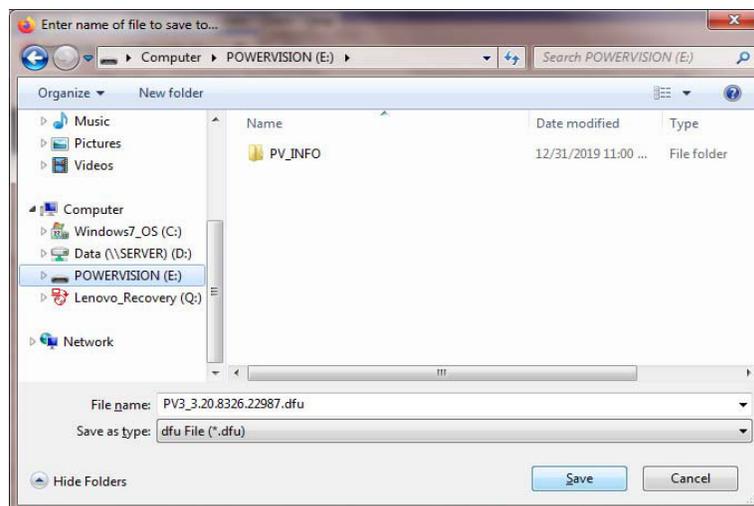
... and select the POWERVISION drive.

In other web browsers, the file may be automatically saved to your "Downloads" directory. In this case, navigate to the downloads directory using a Windows Explorer window, right click on the downloaded file and select "Copy", then navigate to the POWERVISION drive and right-click and select "Paste".
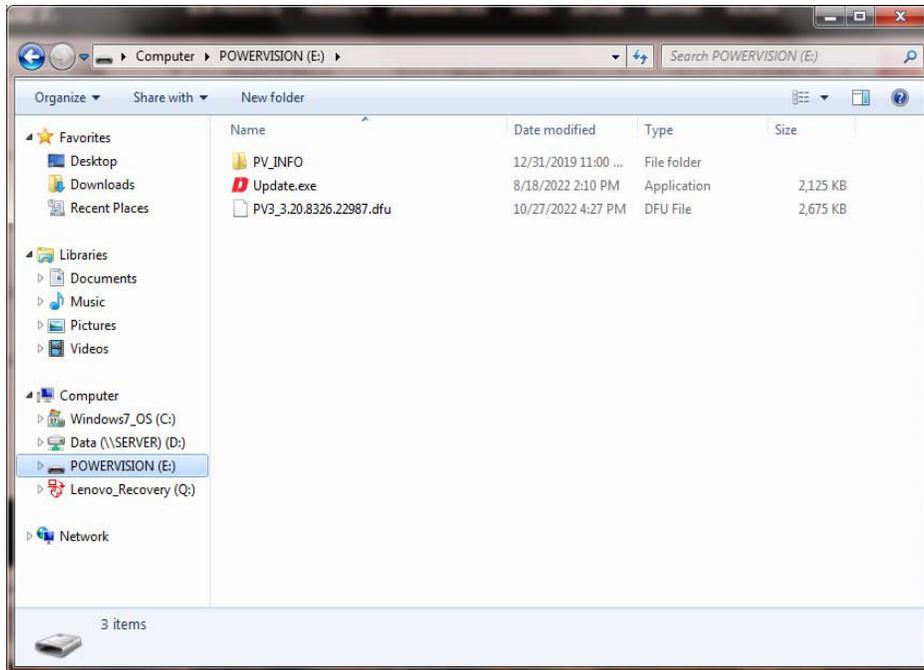
When the download or copy is complete, your POWERVISION drive should show the new firmware file as shown above

Update the PV3 to the New Firmware

Once the new firmware has been placed on the PV3's POWERVISION drive, it's time to perform the actual update.

From the USB mode screen, press RETURN to exit USB mode.

After pressing RETURN, the display will look like the above. Now press the ENTER button.

You will now be at the MAIN MENU as shown above. Next, use the SCROLL down button to select DEVICE TOOLS.

When DEVICE TOOLS is selected as shown above, press the ENTER button.

You're now in the DEVICE TOOLS menu as shown above. Next, use the SCROLL DOWN button to select UPDATE DEVICE.

When UPDATE DEVICE is selected, press the ENTER button.

The new firmware file will appear as shown. If the PV3 firmware has been previously updated, other files may be shown. In that case, use the SCROLL buttons to highlight the new file. Now press ENTER.

Next the PV3 will prompt for confirmation as shown above. Press ENTER to start the update.

Various messages and progress bars will appear as the device updates it's firmware. Do not unplug the USB cord or do anything else to remove power from the PV3 while this process is taking place.

When the update process is complete, this message will show for a few seconds.

The PV3 will then restart itself and come up in USB mode as shown. The PV3 can now be disconnected from the computer.

This completes the updating of the PV3 firmware. Proceed to the next section on retrieving and sending the bike's original tune.

Retrieve and Send the Bike's Original Tune

At HAMMER PERFORMANCE, we base your new tune on your bike's original tune. We've found that by doing it this way, as opposed to providing a tune that originated elsewhere, we avoid a lot of difficult-to-troubleshoot problems. That's because we're limiting the changes to only those things that need to be changed and nothing else. After switching to this procedure many years ago, we found our customers enjoyed a much higher level of first-pass success with their new tunes and as a result, our support issues dropped dramatically.

So the next step in this process, after you've updated your PV3's firmware, is to retrieve your bike's original tune and send it to us. We'll then modify it for your particular combination and send it back to you.

If your bike has been previously tuned with a different tuner, please make every effort to restore the bike's original tune using that previous tuner before proceeding with the following. That will help us out tremendously.

But even if you're unable to do that, and you're sure that your bike's original tune is gone forever, please go through the following process anyway. Many times it provides us with valuable information even if we can't base your new tune on it directly.

Retrieve Your Original Tune

Start by connecting your PV3 to your bike, using the diagnostic cable.

The diagnostic connector on a Sportster is found under the left side cover. Slide it up and to the right to free it, and remove the dust cap.

Plug the PV3's diagnostic cable into the bike's diagnostic connector as shown. The other end of this cable needs to be plugged into the PV3. Leave the PV3's USB cable disconnected.

Now turn your key on, as well as the Run/Stop switch on the right handlebar.

A new, unpaired PV3 will prompt you as shown above. Press ENTER to start the process.

Now the PV3 will prompt you again as shown above, to confirm that you want to pair it to your bike's ECM. Note that once you do this, your PV3 is married to your bike's ECM, and cannot be used with a different ECM. Press ENTER again at this screen.

The PV3 will now proceed to retrieve the tune that's currently in your bike's ECM, as shown above.

When the process is complete, the screen above will appear. Note that the file name will not be the same on your bike. But it will end with .stk and it will be saved on your PV3.

Send Your Original Tune

At this point, disconnect your PV3 from the bike, and hook it up to your PC via the USB cable.

Assuming you updated your firmware as described previously, your PV3 will power up in USB mode as shown above.

The next step is to email the .stk file (that's stored on the PV3) to us, so that we can modify it and send it back. So open your email client and compose an email to tech@hammerperf.com and attach the tune file to it.
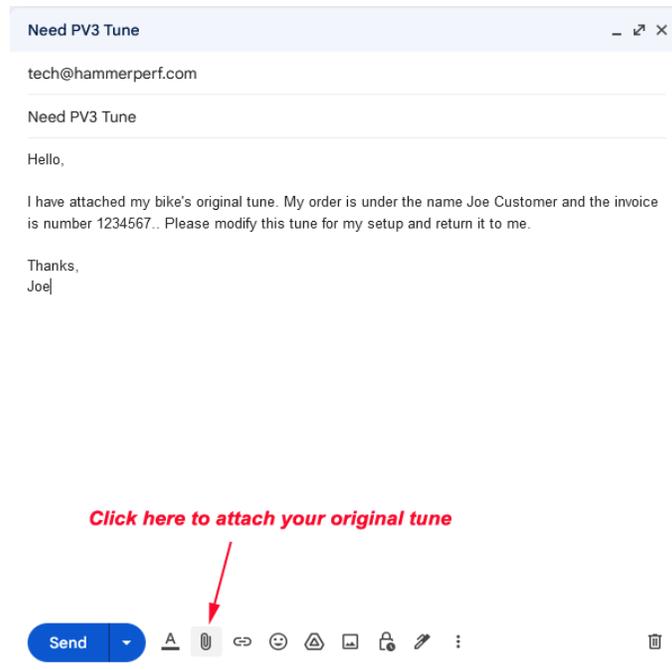
The address you'll be sending the email is "tech@hammerperf.com" as shown. Be SURE to give us enough information to locate your order. The invoice number is great if you have it, but the name on the order will work as well. We can also search on your email address. But if none of these things are provided or correct, we'll be unable to locate your order, resulting in a delay in providing your tune as we correspond with you to gather the information.

If you purchased the kit from one of our dealers, let us know which dealer, and also let us know the details of the build. We need to know what size your kit is, what type of pistons and heads you have, and any other details you can provide on the build such as the cams, exhaust, an air cleaner being used.

Different email clients will vary from the above, which is Gmail's web client. But all email clients provide a way to attach a file when creating an email. A paper clip icon (as shown) is used for file attachment in many different clients, this is very common. But yours may say "attach" or "attach file" or similar, and it may be located in a different place.
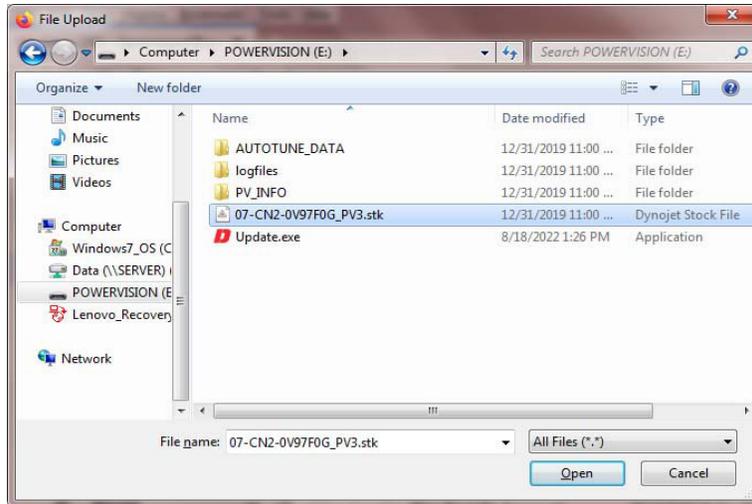
After clicking the icon to attach a file, the email client will then open a dialog box similar to the above, to allow you to select the file. Navigate to the POWERVISION drive as shown, and select the .stk file as shown, and click "Open". The file will now be attached to the email. Now send the email to us.

Receive and Flash Your New Tune

Generally you'll receive your new tune by email within 24 hours. If 24 hours goes by and you haven't received a response from us, it's possible we never got your email. So in that case, give us a call. If it's the weekend, try to send the email (with original tune attached) again. We do check our spam folder regularly, but even so, email is not 100% reliable and sometimes messages don't make it.

Download Your New Tune and Place it on the PV3
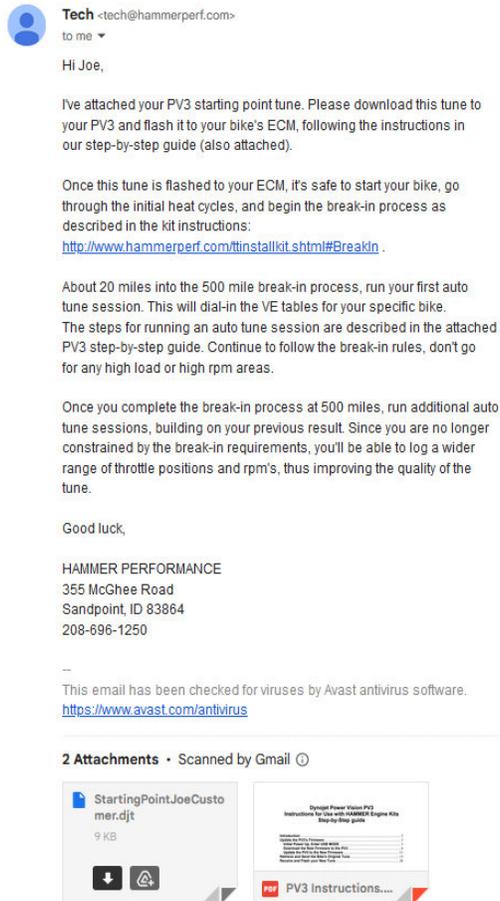
The above is an example of the email you will receive from us, when we send your new tune. Exactly how you go about downloading and saving an email attachment varies depending on your email client, but they all provide a way to do this. In this Gmail example, hover over the tune file attachment as shown in the lower left, and click the download button (the arrow pointing down).
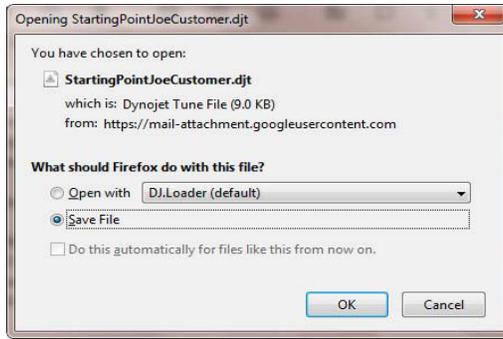
Depending on your email client, you may get prompted to either open or save the file, as shown above. In this case, select "Save File" and then "OK".
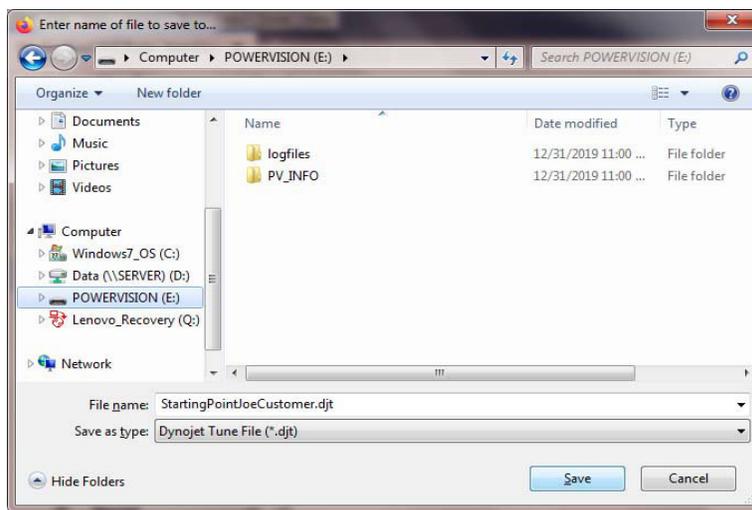
Then select the POWERVISION drive again as shown and click "Save". You've now placed your new tune onto your PV3.

In other email clients or web browsers, when you download an email attachment it may automatically choose where to save the file. In this case, the folder chosen is usually your "Downloads" folder. Navigate to that folder, copy the file, and then paste it onto your POWERVISION drive.

<u>Flash Your New Tune</u>

Disconnect your PV3 from the USB cable, and connect it to your bike using the diagnostic cable as previously described. Turn your key on and also set the Run/Stop switch on the right handlebar to "RUN".

Your PV3 will probably power up at the gauges screen as shown above. Press the ENTER key to get to the main menu.

From the main menu, make sure TUNING is selected as shown above. Press the ENTER key to access the Tuning submenu.

Now make sure FLASH TUNE is selected as shown above. Press the ENTER key to proceed.

The above menu selections should be available. The .stk file is your bike's original tune, we don't want to flash that one. Instead, make sure the starting point tune we provided is selected as shown above and press the ENTER key.

A screen similar to the above will now appear, showing information about the tune you're about to flash to your bike's ECM. Make sure this information is correct and then press ENTER.

You'll have one more confirmation required as shown above. Press ENTER again.
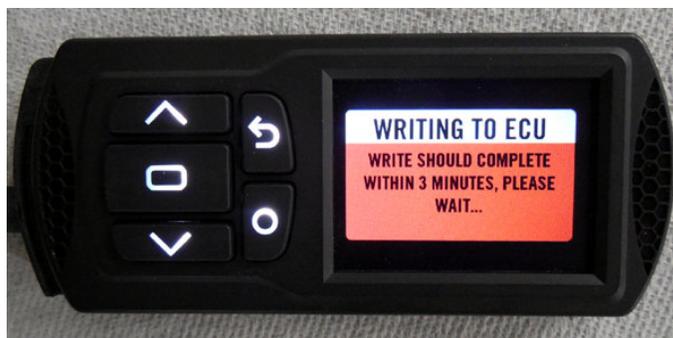
The flash operation will now begin, as shown above. Do not power-off your bike or turn off the Run/Stop handlebar switch during this process.

When the flash operation is complete, you'll see the above message. Now turn your key off, and back on again, and it's safe to start your bike and do the initial heat cycles and begin break-in. Refer to the kit installation instructions for more information on these processes.

Once you're 20 miles or so into your break-in, run your first auto tune session as described in the next section.

Use Auto Tune to Improve Your Bike's Tune

The tune we provide is a base tune. It's safe to start your motor, do your initial heat cycles, and begin break-in. But it can be improved on, using the PV3's Auto Tune feature, and we highly encourage you to do this.

Auto Tune uses your bike's stock oxygen sensors as feedback for determining the volumetric efficiency (VE) table values. Since the stock sensors are narrow-band and only respond around a 14.6:1 air/fuel ratio, and that's a pretty lean ratio, the motor will run somewhat hotter during the logging phase of the Auto Tune process. For this reason, it's a good idea to get 20 miles or so on your new engine kit before running your first Auto Tune session. That gives the rings a chance to increase their contact area with the cylinder wall, which prevents local hot spots that can cause ring micro-welding. This process is called "seating" the rings, and although it can take as long as 500 miles to fully complete, within 20 miles the rings have seated enough to allow auto tuning.

Enable Auto Tune

With the PV3 attached to your bike via the diagnostic cable, turn your key on and put your handlebar Run/Stop switch in the RUN position. Do not start the motor.

Your PV3 will probably power up at the gauges screen as shown above. Press the ENTER key to get to the main menu.

From the main menu, make sure TUNING is selected as shown above. Press the ENTER key to access the Tuning submenu.

In the tuning menu, select AUTOTUNE as shown above and press the ENTER button.

You'll now be presented with three options. Make sure ENABLE is selected as shown above and press ENTER.

In future versions, it's expected that additional wide band options will appear here. But until wide band options are available and you have one of them installed, simply press the ENTER button to select ENABLE AT BASIC.

If you just want to build on the previously flashed tune, just press ENTER at this prompt. That will be the normal case. However, you do have the option of selecting a different tune as the basis for the auto tune section.
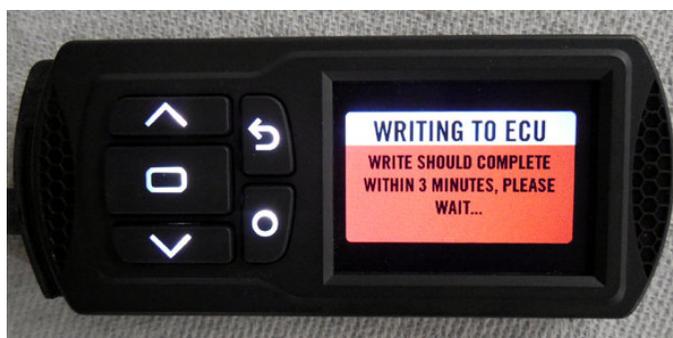
Auto tune will now build a special tune, for logging purposes, and flash it to the ECM.

When the flash is complete, you'll see this message. Turn off the key and proceed to the next section on logging data.

Ride Your Bike and Log Data

Now that you've got auto tune enabled and the special logging tune flashed, it's time to ride the bike. During the ride, the PV3 must remain connected to the bike. It will collect and log information from the oxygen sensors.

Notice the AT in the upper left corner, this is your indicator that you're in auto tune logging mode. When a smile face is next to it, it means logging is taking place. Logging won't take place unless the engine is up to temperature.

The PV3 does not need to be on any particular screen during this process. Also, you can configure gauges on this screen to display various operating parameters of your engine as desired.

Start the bike and begin riding. If you're still in the break-in period for your new engine kit, stay within the break-in rules as described in the kit installation instructions.

The motor may run poorly during the logging phase. This is perfectly normal, because the special tune for logging purposes runs the motor lean so that the stock narrow-band sensors can be used. It also backs out some spark advance to keep the motor from over heating from the lean condition.

Get the engine up to temperature to where logging is taking place. Log for around five minutes or so. Nothing is being improved until you apply the learned values as described in the next section.

<u>Apply the Learned Values</u>

After you've logged for 5-10 minutes, stop the bike and shut off the motor. Turn the key and the Run/Stop switch back on (without starting the motor), and apply the learned values as follows.

Go back to the auto tune menu as previously described, except this time select APPLY VALUES as shown above.

The PV3 will build a new tune, incorporating the learned values from your logging selection, and flash that tune to the bike as previously described. The above screen will be shown when the flash operation is complete.

This new tune is not the final tune however. It still has changes to the AFR and spark advance tables to facilitate auto tune logging, and Auto Tune mode will still be enabled. So you can, if you wish, start the bike and go for another ride and log data, building on the tune you just applied.

<u>Disable Auto Tune</u>

After you have done one to three logging and apply sessions as described previously, do one final "Apply" (as described above) and then disable Auto Tune.

Be <u>sure</u> to do one final Apply before disabling auto tune, otherwise your most recent logging session will not be incorporated into the final tune.

After the final Apply, simply navigate back to the Auto Tune menu and select "DISABLE" as shown above.

The PV3 will then restore the spark advance and AFR tables from the tune you initially started with (when you enabled Auto Tune) into the last applied tune, and then will go through the flash process one final time.

When the final flash is complete, you'll see this message. Power cycle your bike and enjoy your improved tune.

Once you complete the break-in process as described in the kit installation instructions, you'll be able to visit more rpm ranges and throttle positions. Repeat auto tune sessions at this time to learn and tune these additional areas of the map.