Engine Polygraph FAQ

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Q1: I get security warnings from my PC when installing EPReader. Is it really safe to install?

A: The EPReader application may trigger a security warning prior to installing. Please disregard the warning. You can verify that the file is signed by looking at the properties under the digital signature and see that Predictive Fleet Technologies is the one signing the file with a properly encrypted digital signature from GlobalSign. The software is safe and free of any viruses when signed and will not harm your computer if installed.

With the default security setting in Windows 10+ or MS Edge, any file you try to install, signed or not, will give that security warning up front. You may change your setting to "Enable" for downloaded software. However, changing that setting throws up a big warning that your computer is no longer secure.

Q2: My exhaust pressure readings are very low. What might be wrong?

A. A hole in the tailpipe or muffler might be a cause. If so, temporarily plug the hole with wet rags taking care not to actually plug the exhaust stream itself.

Or put the hose from the sensor into the hole, directed toward the engine.

B: Be sure the spring clamp has not slipped and is not pinching the rubber hose of the exhaust sensor, constricting the flow to the sensor.

C. Some cars have a diffuser at the end of the tailpipe such that the exhaust sensor hose might not be reaching the interior of the tailpipe exhaust. In such a case, verify that the sensor hose does go into the tailpipe.

D. You might want to open the PicoScope 6 Software application and verify that the PicoScope is working correctly

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Q3: The EPReader and/or the PicoScope 6 Automotive software indicates that one of my assigned channels is providing no signal.

A: Possible issues:

1. The connections may not be tight at either at the PicoScope or at a sensor. Check that the connections are good at both ends of each cable.
2. Possibly the cable has a defective BNC cable connector or the conductor in the cable has a defect.
3. If you exchange the cables at the sensor-end (not changing the connections at he PicoScope and not changing the screen assignments) and the message still says the same channel has no signal, the cable attached to the reported failing channel is likely bad. You should be able to buy a replacement cable locally quite cheaply (note the length of that cable when looking for the replacement). Cable specs are 'Rg58 coaxial cable with male BNC connectors'.
4. If the message still says the other channel is bad, it is likely that the sensor on that channel is bad. This is very rare, but let us know at support@predictivefleettechnologies.com and we will send you a replacement sensor. We will want you to return the failing sensor to us to find the issue and we can review our manufacturing process.
5. You might want to open the PicoScope 6 Software application and verify if the PicoScope is working correctly. If you can get readings from both of the sensors, connections or cables are the likely issue.

Q4: [This does not apply if you are using EPReader] Some of my signatures have plateaus on the peaks and valleys and/or show extreme voltage (±50 V). What causes such erratic behavior?

A: The PicoScope oscilloscope must be connected to your PC/laptop with a 3.0 USB connector (blue bar in the PC side of the connection.). This is needed to provide adequate bandwidth for the high-speed data transfer required and to provide sufficient power to the PicoScope.

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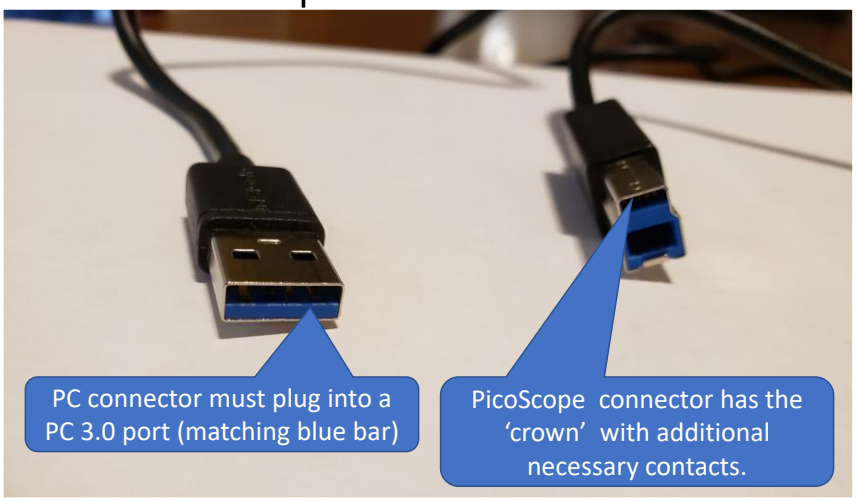
PC-PicoScope 3.0 USB connector



Q5: Will I be charged for an assessment that does not produce a report?

A: No. If the assessment fails for any reason, you should not be charged. Likewise, if you 'EDIT' a signature after you have obtained a report to correct some of your input values, or you want the document in another language, make the changes on the EDIT screen from the Signatures page and SAVE the changes. The new report will be provided free of charge. (The original was charged.)

Q6: What is the ideal sample size (time sweep) for the scope to get an accurate Assessment report? [When not using EPReader]

A: If you are using EPReader, the software will control the sweep duration. The time sweep must be long enough to include 5 rotations of the crankshaft (in a 4-stroke engine): 1500 rpm = 500 ms; 500 rpm = 1000 ms (1 second); 250 rpm = 1500 ms; 3000 rpm = 200 ms. The sweep may be longer than the indicated values; a 500 ms sweep should cover a wide variety of engine speeds.

Q7: Is it important to keep the engine speed constant during the signature capture?

A: Yes, very important if you are requesting an Engine Polygraph report. The reports measures differences in the time of the strokes among the cylinders. A variation of engine speed during the signature can alter the report interpretation. This is a reason to keep the time sweep near the lower limits described for the sample size/time sweep. If you use EPReader, that program will accept the input only if the engine is at a steady rpm.

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Q8: How accurate does the RPM need to be when I enter it on the Signature record?

A: The RPM is calculated based on the signature data, so the value you record should be similar. The report shows the input estimate and the value determined by the software (in parentheses). Typically, your estimate needs to be within about 15% of the actual RPM. You can change your estimate on the EDIT screen for the signature and re-submit to get a revised report. You will not be charged for a report from an edited signature. An alternative is to use an OBDII reader with Bluetooth connectivity to send the engine Temperature and rpm speed from the engine control module (ECM) sensors to EPReader.

Q9: Sometimes I get more or fewer peaks in the exhaust 'Model' graph in an engine cycle

(between the two vertical, solid red lines on the graph = 2 revolutions for a 4-stroke engine) and the scores are worse than I believe is realistic. What's up?

A: (Read the next question, too.) If your engine is firing on all cylinders and your input estimate of RPM is too high, you may get too few peaks (cylinders) displayed in the estimated engine cycle time for 720° rotation of the slower engine ,and consequently, poor interpretation of the data; if your estimate is too slow, you will get too many peaks in the actual faster engine cycle time for 720° rotation, also with poor interpretation. In either case, use the EDIT function of the Signatures screen to increase or decrease your input estimate by about 15% and SAVE the revision. The data file is unaffected by the estimate so you don't need to upload a new file.

Q10: On some newer engines, I get about half the number of peaks in an engine cycle as there are cylinders in the engine. What's up with this?

A: Some engines have a form of 'Cylinder Deactivation', (CD) (also called Cylinder Cutout or Active Fuel Management (AFM) or Displacement on Demand (DoD)) to reduce the number of cylinders burning fuel with light load.

In some engine models, the engine will fire on all available cylinders when at idle (no depression of the accelerator), so you should run a signature at Condition = 'Idle'. The PFT system has data for each engine model and the report will indicate if you are running a 'CD' engine at other than Idle.

- Some manufactures approve of specific modules (**AFM Disablers**) that plug into the ECM port that will force all cylinders to attempt firing. This may require an **OBD-II Y Splitter** to accommodate multiple modules to simultaneously access the ECM port; e.g., a Bluetooth ODBII reader and the Cylinder Cutout Override modules. The PFT system has data for each engine model and the report will indicate if you are running a 'CD' engine at other than Idle.

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B. Also, some modern turbocharged engines (Twin Scroll or Dual volute) are designed so the exhausts from every other cylinder in the firing order are combined in separate exhaust manifolds to minimize turbulence and back-pressure.

- In either case, you may change the input rpm estimate to ½ the observed value and re-run. The analysis will be normally be quite valid by 'averaging' the two engine cycles of 720° each. The PFT system has data for each engine model and the report will indicate if you are running a '**Twin Scroll** or **Dual volute**' engine.

Q11: Help me understand how to get the crankcase sensor data with unusual dipstick tubes.

A: We provide a set of attachments to cover many oil dipstick tubes: The tapered nozzles handle many tubes and sometimes the short rubber tube that is provided will do the trick. The three-way adapter handles a number of large vehicles to the Harley-Davidson motorcycles. In addition:

1. Some smaller engines (Yanmar, etc.) have 1.25" ID oil fill/dipstick tubes. We provide a 1.25" OD plastic tube with 1" ID for the 3-way adapter in the kit.

2. To get a sample from a common Cummins dipstick tube with the notched 'cup' at the top, we provide a tapered nose attachment so that the narrow section can be inserted into the tube and the SenX sensor can be above the wider diameter tube. The narrow tube fits many other oil dipstick tubes snuggly.

3. Some horizontal exhausts now have baffles to reduce the danger of starting grass fires from the heat of DPF regens. (E.g., Paccar) To accommodate these, we provide a 27" silicone rubber hose that can be used to 'thread' through the baffles to get a good exhaust pulse from the exhaust. The FirstLook sensor with tapered attachment can be inserted to the external end of the hose.

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4. The clamp of the provided exhaust sampler might slide and squeeze the silicone hose. Verify that the clamp is over the metal insert that is designed to prevent distortion of the airflow from the exhaust to the sensor.

Q12: The adapters that came with the diesel kit are not providing a snug fit in the oil filler tube. What should I do?

A: As long as the section of hose attached to the threaded sensor has a 3/8" I.D., the O.D. of the short segment going into the oil filler tube can be of any dimension to fit, provided the opening at the end is not less than 1/4" I.D. In some engines, there is not an oil dipstick tube so the oil fill tube might be used. One of the supplied larger attachments might work. In some engines, it may be necessary to wrap the adapter with cloth and tape to fit snuggly into the oil tube.

Q13: How do I do a cold-crank test safely?

A1: You are right to be concerned. It is important that no fuel gets to the cylinders during the cold crank.

- Some engines are designed such that there is no fuel supplied to the cylinders if the accelerator is depressed all the way to the floor. If you try this, be sure to verify that this works for your vehicle by trying it out. If it doesn't have this feature, the engine may start with a very high engine speed and scare people in the area.
- You can pull the fuse to the fuel pump to prevent fuel from being pumped into the cylinder.

Q14: How accurate does the engine temperature need to be when I enter it on the Signature record?

A: The temperature should be within plus or minus ten degrees of the actual engine temperature. This is used to allow you later to compare reports; an engine that has not been warmed up may be going through various air/fuel ratios, spark plug timing advances, etc. that will affect the interpretation. Normally you want the engine near driving operational conditions. Diesel engines typically need the engine parts at operational temperatures so that they are expanded, presenting a 'tighter' engine.

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Q15: Can I take a signature with a cold engine?

A: Our experience suggests that the engine coolant temperature is not very significant for gasoline engines. But diesel engines should be warm to at least 170°F (77°C).

Q16: Is it important if the waveform goes off the screen in places?

A: Yes, the file created by the PC oscilloscope reports a value at a moment only if the voltage is within the range that you have specified for that sensor. If that happens more than rarely, the software will not be able to give a reliable interpolation. (The software will attempt 'curve fitting' to estimate the missing values if there are not too many missing values.) If you see that the waveform exceeds the limits of the display, increase the range for the channel.

Q17: My system does not seem to recognize the PicoScope driver. I've checked connections but it still doesn't work.

Be sure you have downloaded a production version of the PicoScope **Automotive 6** software. Do **not** download a beta version. (You MAY have an PicoScope **Automotive 7** software also installed on your laptop – the two can co-exist. But the **PicoScope 6 Automotive** installation is **required**.

A: Several things could be happening.

1. The Pico device drivers that control data flow between the PC and PicoScope are installed specifically for the driver that was connected when installed. If you plug into a different port later, the system should install the driver to that port. But if it did not re-install the driver, continue to step 2:
2. The Pico device driver might have been corrupted:
    a. Look at the Device Manager in the Windows Control Panel.
    b. 'Right-click' to see if it proposes to Update the driver. Choose 'yes' if the choice is there.
3. The Pico software might have been corrupted:
    a. Uninstall the Pico software and then re-install if from a new download from the Pico website.
    b. Reinstall the **PicoScope 6 Automotive** software (should be at: C:\Programfiles(x86)\Pico Technology)). If not there, download a new copy/version from the Pico website.
    c. Restart the computer

Q18: [When not using EPReader] Can I combine multiple signatures in one file for upload?

A: No. Each signature should be a single file, normally 200-300kB in size. This is important that if your PC oscilloscope preferences specify storing multiple buffers; if so, save only one for upload to Engine Polygraph.

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Q19: [When not using EPReader] The *.psdata file is too large for the Engine Polygraph to upload. What should I do?

A: Chances are that you either are saving a very long duration (much longer than 500 ms) or you are saving multiple buffers of data. Pico allows you to capture up to 32 buffers (separate signatures) for you to browse. (See Preferences.) Pick one that looks stable and save it. Select the option to Save 'Current waveform only' and upload that one into Engine Polygraph. Engine Polygraph will analyze only one waveform in a single report request.

Q20: [When not using EPReader] How should I name my signature files?

A: The Pico software proposes a filename with the current date followed by a sequence number. You might add a short description of the vehicle/engine and the rpm from the tachometer. This should make it easier to spot for the upload process. You may want to delete the file from your PC after you upload it.

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