I'm not a bot

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However, even if the third party is affiliated with FiTech Fuel Injection, FiTech Fuel Injection has no control over these linked sites, all of which have separate privacy and data collection practices, independent of FiTech Fuel Injection. These linked sites are only for your convenience and therefore you access them at your own risk. Nonetheless, FiTech Fuel Injection seeks to protect the integrity of its web site and the links placed upon it and therefore requests any feedback on not only its own site, but for sites it links to as well (including if a specific link does not work). Thread Starter Joined: Oct 2006 Posts: 7 Likes: 0 Received 0 Likes on 0 Posts From: Estero, Florida Can you change the rotation of 5.7 Mercruiser? Is it possible to change the rotation of a 5.7 merc? Has anyone pulled it off? I have come into one that if I can change the rotation I can use it to replace a missing motor in my CC Stinger. I have heard rumors that it can be done but you have to relace the pistons,rods,cam, & distrib. gear. Joined: Aug 2004 Posts: 15 Likes: 0 Received 0 Likes on 0 Posts From: walton,ky Re: Can you change the rotation of 5.7 Mercruiser? camshaft and distributor gear Thread Starter Joined: Oct 2006 Posts: 7 Likes: 0 Received 0 Likes on 0 Posts From: Estero, Florida Re: Can you change the rotation of 5.7 Mercruiser? Is that all there is to it?? Joined: Jun 2006 Posts: 18 Likes: 0 Received 0 Likes on 0 Posts From: Buffalo NY Re: Can you change the rotation of 5.7 Mercruiser? Chris Craft had a reverse rotation 350 (volvo). They used a camshaft with a gear to gear drive vs a timing chain, this way the oil pump still turned the proper direction. They also used a special rear main seal. If you look closely at a rear main seal there are small grooves that direct the oil back towards the center of the engine when it rotates.If the incorrect seal is installed the oil that gets past the lip seal will be pushed out. Strangest Small block I ever saw. The motor was installed backwards in the boat and drove the outdrive off the front of the crank. Registered Re: Can you change the rotation of 5.7 Mercruiser? ms, That is all there is mostly. To really do it correctly, you should also swap the pistons from one side of the block to the other. The reverse rotation engines had them in "backwards" compared to the "normal" rotation engines. You could probably leave them like they are but you might get some piston slap noise due to the offset wrist pins. The other problem you are going to run into is the rear main and timing cover seals. The seals need to be the correct ones for a reverse rotation engine. The seals have small grooves on them that help pull the oil back into the engine, and if you use the normal seals on a rev. rot. engine, they will pull all of the oil out and make a pretty good mess. You will need to use the reverse rotation starter too. All of the parts are readily available. Hope this helps, Bill Koustenis Advanced Automotive Machine Waldorf Md Joined: Sep 2006 Posts: 151 Likes: 0 Received 0 Likes on 0 Posts From: Auckland Re: Can you change the rotation of 5.7 Mercruiser? I wouldnt even consider to do it without swaping the pistons over, I think you will be looking for trouble if you do. Platinum Member Joined: Jun 2004 Posts: 8,118 Received 523 Likes on 347 Posts From: St-Hyacinthe, quebec, canada Re: Can you change the rotation of 5.7 Mercruiser? I agree not changing pistons. Joined: Dec 2003 Posts: 8,306 Likes: 0 Received 3 Likes on 3 Posts From: Los Angeles California Re: Can you change the rotation of 5.7 Mercruiser? Besides the pistons... you may have forgotten that the crankshaft is drilled to oil the rod journals prior to compression. What about the cooling system? Are you going to run the sea water pump backwards? Or the main water pump if it is still installed? What about the timing marks on the vibration damper... they will be backward also. What about a supercharger, it would have to be configured to run in reverse too. The main reason engines were modified to run in reverse harkens back to the old days before outdrives that could change the direction of the prop. So... if you were running twin engines and wanted counter rotation props, your only choice was to run the port engine in reverse (if you wanted your props turning "out").Some people have the idea that both engines turning the same direction "torques" the boat over.... maybe... just a little. But the rotating mass of the crank and flywheel weigh just over one hundred pounds.... is it really going to effect the hull that weighs 100 times that? Some people think so... I don't..... Joined: Dec 2003 Posts: 8,306 Likes: 0 Received 3 Likes on 3 Posts From: Los Angeles California Re: Can you change the rotation of 5.7 Mercruiser? Here is a nice alternative to reverse rotation.... mount two engines tail to tail and have a shaft that goes around the rear engine..... Attached Thumbnails Joined: Nov 2003 Posts: 368 Likes: 0 Received 2 Likes on 2 Posts From: Jamesport, New York Re: Can you change the rotation of 5.7 Mercruiser? Dumb ? but I have worked on quite a few twin I/O's have not run onto opposites are you sure yours turn opposite or do you just think so? Contact Us - Archive - Advertising - Cookie Policy - Privacy Statement - Terms of Service Copyright © 2025 MH Sub I, LLC dba Internet Brands. All rights reserved. Use of this site indicates your consent to the Terms of Use. Please Login or Register to create posts and topics.Quote from djstucker on November 13, 2019, 12:24 amSo here is an interesting one. A month or two ago I took my unit to Fitech to have the ECM replaced under warranty. It would die whenever it got hot. Anyway, unrelated to that issue, after they replaced the ECM I reinstalled the unit, but now it wouldn’t idle. After emailing back and forth a few times with them, they had me replace the IAC with no change to the issue, and finally bring it back down to them. They put it on a test engine stand and it worked fine. Note: their test engine is a 350 SBC. I was kind of baffled at this, but I begrudgingly took it back home because they said there was nothing wrong with it. Put it on my motor, still wouldn’t idle. Note: my motor is a 468 BBC. I noticed after trying to watch it try to idle that the AFR was dipping to 11.1 even with the IAC at full open. So I kept turning up the butterfly adjustment screw until it would idle, and finally adjusted it so that the IAC steps were in range. I was surprised to find that I was at 3.5-4 turns. Way more than Fitech said it needed to be, but this ultimately solved my problem, and it was back up and running fine. Fast forward a month. I was making some adjustments to my throttle cable, and I noticed that while fully opening the throttle, the secondaries were not opening all the way. I debated if I wanted to play with this, but untimely I did. I adjusted the threaded rod so that the secondaries hit the end stop at the same time as the primaries. I think here is where all my mysteries are explained. Because the secondaries were not opening all the way, they also were not as open as the primaries were in the closed position, resulting in less air going through the butterflies at idle. This explains the 3.5 turns to get it to idle. Now I’m back to 2 turns. Now, how did it get this way? I am assuming that when Fitech took the unit apart to replace the ECM, they took the linkage apart and didn’t adjust it properly when they reassembled. I assume it was adjusted properly before because it’s unlikely they touched the adjustment screw and it idled fine before at around 2 turns. As to why I mentioned the engine sizes, it takes far less air to idle a 350 than a 468. This explains why it idled fine on their test stand. Just thought this would be good information for everyone in case someone else runs into something like this. I am certain that the primaries and secondaries should be adjusted to be in sync. It didn’t make any sense that the secondaries were not opening all the way. Penny for anyone’s thoughts. So here is an interesting one. A month or two ago I took my unit to Fitech to have the ECM replaced under warranty. It would die whenever it got hot. Anyway, unrelated to that issue, after they replaced the ECM I reinstalled the unit, but now it wouldn’t idle. 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As to why I mentioned the engine sizes, it takes far less air to idle a 350 than a 468. This explains why it idled fine on their test stand. Just thought this would be good information for everyone in case someone else runs into something like this. I am certain that the primaries and secondaries should be adjusted to be in sync. It didn’t make any sense that the secondaries were not opening all the way. Penny for anyone’s thoughts. redriderjf87, 69_R-Code and 2 other users have reacted to this post.69 Chevy C20, 468CI BBC w/Go EFI 600 TB UnitQuote from tony-muscle on November 14, 2019, 9:55 amI had to adjust the secondaries as well. In my case, it was that when in idle, the secondaries were open slightly more than the primaries so there was not enough resistance from the linkage to keep the secondaries fully close. This caused the secondaries to stay open sometimes leading to a "hanging" idle situation. I adjusted the secondaries so when in idle the linkage is in "contact" with the primaries. This solved the issue. Elsewhere in this forum I explained this issue and criticized the fact that FiTech makes no mention of the secondaries adjusting screw. I guess their premise is that it shouldn't be adjusted, but in some situations it needs to. I didn't even realize it existed until after two years of ownership and headaches with hanging idle. I had to adjust the secondaries as well. In my case, it was that when in idle, the secondaries were open slightly more than the primaries so there was not enough resistance from the linkage to keep the secondaries fully close. This caused the secondaries to stay open sometimes leading to a "hanging" idle situation. I adjusted the secondaries so when in idle the linkage is in "contact" with the primaries. This solved the issue. Elsewhere in this forum I explained this issue and criticized the fact that FiTech makes no mention of the secondaries adjusting screw. I guess their premise is that it shouldn't be adjusted, but in some situations it needs to. I didn't even realize it existed until after two years of ownership and headaches with hanging idle. redriderjf87 and b1ackth0rne have reacted to this post.1971 Mach 1 Mustang w/Ram Air, 408-4V stroked Cleveland, Hooker headers, FiTech EFI w/ RobBMC PowerSurge pumpQuote from ajax-1947 on November 14, 2019, 4:21 pmMy answer from Fitech when I could not get my IAC above 0-1 - it worked. In my instance it appeared the rear blades were held open too far even though the front blades are used for adjusting the IAC. Different problem to above, but indicates that adjustment of rear blades may be necessary. On setting the IAC I would kind of start over. You want to look at both idle set screws which on this unit is on the throttle linkage side of the throttle body. Make sure that the rear throttle screw is making contact with the adjustment arm of the rear blades. If it is not, screw the set screw in until it makes contact with the arm and go ¼ turn in making sure you see the blades move. Most common issue is people setting the IAC with the front blades only, this will cause all types of idle and running issues. Let the engine get up to operating temperature 165-170 or higher then you will adjust the front and rear throttle blades until we get the IAC number under 10 but not stuck on 0. If it is stuck on zero you will unscrew the throttle blades front and rear until we get a reading under 10 but not staying on zero. If it is above 10 you will screw in both front and rear screws until the number is again under 10 but not sitting on zero. You want to do this adjustment with the car in park or neutral and no AC on. Once this is done you will wan to shut off the engine and let the ECU power down (about 30 seconds) and this will reset the TPS back to zero and you are now good to go. You should see the idle catch itself when you go from park to drive or any accessories turn on like the Fan or AC. Hope this helps. My answer from Fitech when I could not get my IAC above 0-1 - it worked. In my instance it appeared the rear blades were held open too far even though the front blades are used for adjusting the IAC. Different problem to above, but indicates that adjustment of rear blades may be necessary. On setting the IAC I would kind of start over. You want to look at both idle set screws which on this unit is on the throttle linkage side of the throttle body. Make sure that the rear throttle screw is making contact with the adjustment arm of the rear blades. If it is not, screw the set screw in until it makes contact with the arm and go ¼ turn in making sure you see the blades move. Most common issue is people setting the IAC with the front blades only, this will cause all types of idle and running issues. Let the engine get up to operating temperature 165-170 or higher then you will adjust the front and rear throttle blades until we get the IAC number under 10 but not stuck on 0. If it is stuck on zero you will unscrew the throttle blades front and rear until we get a reading under 10 but not staying on zero. If it is above 10 you will screw in both front and rear screws until the number is again under 10 but not sitting on zero. You want to do this adjustment with the car in park or neutral and no AC on. Once this is done you will wan to shut off the engine and let the ECU power down (about 30 seconds) and this will reset the TPS back to zero and you are now good to go. You should see the idle catch itself when you go from park to drive or any accessories turn on like the Fan or AC. Hope this helps. redriderjf87 and Pepsi have reacted to this post.Quote from redriderjf87 on December 15, 2019, 12:59 amThanks, this is nice info. I am fighting a perpetual lean tip-in issue (3 years since I've owned the system, seems kind of ok sometimes, but never really fixed despite 50+ Accel and maxing out 3D Accel). In addition, over time I have had a number of weird issues: Rpm's always drop very fast despite adjusting the IAC/RPM Decay Erratic fuel learn changes under steady state throttle/RPM Once in a great while, my idle and IAC values sit high (45 IAC, 1500 RPM), then go back to target RPM with 5-10 IAC. Today, I noticed playing with the throttle body that I am seeing the same as DJ, in that my secondaries are noticeably less open than the primaries on WOT and at idle. There is a bit of play manually moving the secondary before the threaded rod hits the primary (at WOT and idle). I am definitely going to adjust the slack and redo the idle adjustments. My question to start off with, is what is the point of the rear idle screw, and why wouldn't you just back it off? That way the front/rear are in sync, and then you just adjust the primary screw to get your IAC's at 3-10. Feel free to roast me if I'm missing something obvious. Thanks again for this info, and I will update ASAP what I find, crossing my fingers this makes some sort of difference. Justin Thanks, this is nice info. I am fighting a perpetual lean tip-in issue (3 years since I've owned the system, seems kind of ok sometimes, but never really fixed despite 50+ Accel and maxing out 3D Accel). In addition, over time I have had a number of weird issues: Rpm's always drop very fast despite adjusting the IAC/RPM Decay Erratic fuel learn changes under steady state throttle/RPM Once in a great while, my idle and IAC values sit high (45 IAC, 1500 RPM), then go back to target RPM with 5-10 IAC. 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Justin 1981 Camaro Z-28 - 350 SBC, TKO600 5-spd, 4.11 gears Go EFI 600 4-bblQuote from taylorteamracing on December 15, 2019, 1:36 amI would like to know that myself why cant it be set up just like a mechanical carb you press the pedal they all 4 open at same time and rate ,,, remember the old 660 center squitter holly's I would like to know that myself why cant it be set up just like a mechanical carb you press the pedal they all 4 open at same time and rate ,,, remember the old 660 center squitter holly's Quote from tony-muscle on December 16, 2019, 12:30 pmI don't know if this is the correct way, but what worked for me was to adjust the secondary so there is no play in idle. You have to go back and forth between IAC and secondary adjustments until all is good. At full throttle my secondaries are slightly behind (maybe 90%), but in real life I doubt it will make any difference. I don't know if this is the correct way, but what worked for me was to adjust the secondary so there is no play in idle. You have to go back and forth between IAC and secondary adjustments until all is good. At full throttle my secondaries are slightly behind (maybe 90%), but in real life I doubt it will make any difference. 1971 Mach 1 Mustang w/Ram Air, 408-4V stroked Cleveland, Hooker headers, FiTech EFI w/ RobBMC PowerSurge pumpQuote from taylorteamracing on December 16, 2019, 7:38 pmthe other issue I have is I have the dual power adder and the throttle pressure is like 50 pounds lol I am thinking of trying to un hook the slave throttle body throttle spring the other issue I have is I have the dual power adder and the throttle pressure is like 50 pounds lol I am thinking of trying to un hook the slave throttle body throttle spring Quote from tony-muscle on December 17, 2019, 3:27 pm Quote from taylorteamracing on December 16, 2019, 7:38 pm the other issue I have is I have the dual power adder and the throttle pressure is like 50 pounds lol I am thinking of trying to un hook the slave throttle body throttle spring You may be able to unwind one turn, or less, off the spring to see if it works. Quote from taylorteamracing on December 16, 2019, 7:38 pm the other issue I have is I have the dual power adder and the throttle pressure is like 50 pounds lol I am thinking of trying to un hook the slave throttle body throttle spring You may be able to unwind one turn, or less, off the spring to see if it works. 1971 Mach 1 Mustang w/Ram Air, 408-4V stroked Cleveland, Hooker headers, FiTech EFI w/ RobBMC PowerSurge pumpQuote from redriderjf87 on December 29, 2019, 10:09 pm Quote from taylorteamracing on December 15, 2019, 1:36 am I would like to know that myself why cant it be set up just like a mechanical carb you press the pedal they all 4 open at same time and rate ,,, remember the old 660 center squitter holly's I personally think there could be improvements in the linkage setup, and how FiTech checks it (or doesn't) for play. Quote from taylorteamracing on December 15, 2019, 1:36 am I would like to know that myself why cant it be set up just like a mechanical carb you press the pedal they all 4 open at same time and rate ,,, remember the old 660 center squitter holly's I personally think there could be improvements in the linkage setup, and how FiTech checks it (or doesn't) for play. 1981 Camaro Z-28 - 350 SBC, TKO600 5-spd, 4.11 gears Go EFI 600 4-bblQuote from taylorteamracing on December 29, 2019, 10:24 pmI am going to to look at it long and hard and see what I think will work this week ill report back I am going to to look at it long and hard and see what I think will work this week ill report back Please Login or Register to create posts and topics.Quote from 55prostreet on June 1, 2019, 5:48 pmNO fuel pump prime on key turn on. Can ground yellow on pump relay pump runs. Couldn't find main yellow fuel pump relay control primary at pin 27. Have schematic of fitech wiring . No pin 27 on ECU connector viewed from harness side. Did find pin 27 yellow on a couple other plugs but they where un-used. So no pump on signal to yellow wire on relay ! NO fuel pump prime on key turn on. Can ground yellow on pump relay pump runs. Couldn't find main yellow fuel pump relay control primary at pin 27. Have schematic of fitech wiring . No pin 27 on ECU connector viewed from harness side. Did find pin 27 yellow on a couple other plugs but they where un-used. So no pump on signal to yellow wire on relay ! Quote from Paul Bell on June 1, 2019, 7:40 pm"Did find pin 27 yellow on a couple other plugs but they where un-used." Your post is a little confusing. There are several yellow wires that terminate in the ECM plug. Are you saying the pin well for position 27 has no connector pin in it in the harness plug? You say you have the schematic of Fitech wiring, is it a wiring line drawing or just the list of pins and colors? "Did find pin 27 yellow on a couple other plugs but they where un-used." Your post is a little confusing. There are several yellow wires that terminate in the ECM plug. Are you saying the pin well for position 27 has no connector pin in it in the harness plug? You say you have the schematic of Fitech wiring, is it a wiring line drawing or just the list of pins and colors? Quote from 55prostreet on June 1, 2019, 8:24 pmPins and wire's yes many yellow wire's the ones for the fuel pump say that they are the pin 27 on the pin out sheet I down loaded. I was trying to find out where the pump on signal originated from so as to test it the sheet says fitech pin function pin 27. Fitech ultimate LS ECU #7005x pin 27 fuel pump relay control primary YELLOW. Pins and wire's yes many yellow wire's the ones for the fuel pump say that they are the pin 27 on the pin out sheet I down loaded. I was trying to find out where the pump on signal originated from so as to test it the sheet says fitech pin function pin 27. Fitech ultimate LS ECU #7005x pin 27 fuel pump relay control primary YELLOW. Quote from 55prostreet on June 1, 2019, 8:27 pmP.S. ECU connector viewed from the harness side didn't show a pin 27 location. A wiring schematic would be nice to chase down the wiring to find the source of the pump turn on signal. Similar Threads - Speedmaster Bobber Same The Edelbrock E Street EFI system features a universal throttle body designed to fit any V8 engine originally equipped with a carburetor and intake manifold with a square-bore, 4150-style carburetor flange. The systems include easy-to-use software preinstalled on the supplied touch screen Android tablet. Carburetors have long served the performance aftermarket and racing industry well. Although they disappeared from new vehicles back in the late 1980s to meet emission requirements, it was only a couple of years ago that NASCAR finally abandoned carburetors in favor of fuel injection. Carburetors are mechanical metering devices that use atmospheric air pressure and intake vacuum to deliver fuel to the engine. Intake vacuum siphons fuel from the fuel bowl through the main metering circuit and idle circuit so it can mix with air as the air/fuel mixture enters the intake manifold. Cold starting requires a fairly rich air/fuel mixture, so a manual or automatic choke is needed to restrict airflow into the carburetor and to increase the throttle opening for a faster cold idle speed while the engine warms up. Chokes require adjusting, and can be troublesome. Race carburetors have no chokes because they get in the way which can make starting difficult in cooler weather. Carburetors also have adjustment screws for the idle mixture and idle speed. The idle mixture affects idle speed, so the two have to be adjusted more or less simultaneously so the idle will not be too fast or too slow. Opening the carburetor throttle to accelerate requires an accelerator pump circuit and discharge nozzles so the engine doesn’t bog when it ingests a big gulp of air. Setting up the accelerator pump can also be tricky because too much fuel is just as bad as too little fuel. And if somebody pumps the throttle linkage a little too much when cranking the engine, they can flood the engine and wet foul the spark plugs. Carburetors also have a power valve circuit to add extra fuel when the engine is lugging under load and intake vacuum drops. Carburetors also require constant adjustments. As soon as the air temperature or atmospheric pressure changes, it’s out of tune. The float level setting inside the fuel bowl affects the air/fuel mixture, which is determined mostly by the size of the main metering jets or needles. Adjusting the air/fuel mixture requires manually changing the jets to richen or lean the fuel mixture. On a hot summer day, warm air is less dense so smaller main jets are needed to maintain the same air/fuel ratio. Conversely, on a colder day air is more dense so larger jets are needed to prevent the air/fuel mixture from leaning out. Quick Fuel’s QFI is a bolt-on throttle body electronic fuel injection system capable of supporting 500 horsepower.While the market is awash with bolt-on EFI systems, QFI is different: It combines the superior fuel atomization aspects of a carburetor with the precise fuel control of EFI. This constant back and forth fiddling has long been a ritual of race day carburetor tuning. But with fuel injection, you don’t need a screwdriver or wrenches to change jets, accelerator pumps and power valves because Electronic Fuel Injection (EFI) is self-tuning. How EFI Works With fuel injection, the fuel mixture is monitored by a wideband oxygen sensor mounted in the exhaust. Throttle position, air temperature and manifold absolute pressure (MAP) are also monitored by separate sensors. Feedback from these sensors allow the EFI control unit to constantly fine tune the fuel mixture to changing operating conditions. EFI is less dependent on intake vacuum for fuel delivery because fuel is sprayed into the engine through injectors. A fuel pressure regulator maintains steady line pressure to the injectors, while the EFI control unit determines the duration (on time) of each injector when fuel is sprayed into the engine. Increasing injector duration adds more fuel while decreasing injector duration leans the air/fuel mixture. With throttle body EFI systems, fuel is sprayed through the throttle body into the intake manifold like a carburetor. With multi-port EFI, each cylinder has its own separate injector and fuel is sprayed directly into the intake ports in the cylinder head. If the multi-port EFI system has “sequential” injection, each injector is triggered individually rather than gang fired, which allows for faster, real time air/fuel adjustments. Many late model engines with Gasoline Direct Injection (GDI) take it a step further and spray fuel directly into the combustion chamber under extremely high pressure, similar to a diesel. Currently, there are no aftermarket GDI conversion kits available. Such a kit would require different cylinder heads, different pistons (because GDI pistons usually have depressions, pockets and/or ramps to direct airflow within the cylinder), and a high pressure mechanical fuel pump. However, there are numerous aftermarket throttle body and multi-port EFI conversion kits that allow almost any carbureted engine to be converted to EFI. EFI Advantages EFI offers a number of important advantages over a mechanical carburetor: • Because fuel is sprayed under pressure into the engine, there is much better fuel atomization. A more homogeneous air/fuel mixture improves cold starting, idle smoothness, throttle response, fuel economy and emissions. • Throttle body EFI systems can be easily installed on almost any engine with a square bore 4150 or 4500 style intake manifold, including dual quad carburetor setups on higher horsepower engines. It’s pretty much a bolt-on installation that uses the same throttle linkage and air cleaner as the original carburetor. It doesn’t alter the basic look of the engine or intake plumbing. • EFI provides consistent all-year drivability for street driven vehicles. It’s an ideal upgrade for a vintage muscle car, sports car, classic car, street rod, resto rod or race car (if rules allow it). Many of today’s resto rods are fueled by some type of EFI system (OEM or aftermarket). With EFI, you don’t have to wait five minutes for the engine to warm up before you can drive away without the engine bogging or backfiring. An EFI conversion allows the engine to fire immediately with the first crank, to idle smoothly whether the engine is hot or cold, and to accelerate without any embarrassing pops, sputters or bogs. • On many applications, EFI can actually add horsepower (although some would argue that a big carburetor always makes more power). An engine can usually handle a throttle body with larger bores (and thus more CFM airflow) with EFI. Some throttle body EFI systems are rated at 1100 CFM, which is considerably more than your typical 650 or 800 CFM carburetor that’s often used on a small block or big block motor. A carburetor that’s too big for a given engine will often have poor throttle response and torque at low to mid-range RPM, but work well at high RPM. With EFI, a larger throttle body works well at all engine speeds. This EZ-EFI self-tuning fuel injection system Maste Kit from FAST includes an inline fuel pump kit. A multi-port EFI system with a front-mounted throttle can sometimes provide better airflow into the engine than a single plane intake manifold with a carburetor. Some EFI suppliers claim the change is good for 20 more horsepower over a carburetor. • Multi-port EFI provides better cylinder-to-cylinder fuel distribution than a carburetor because only air flows through the intake manifold. With a carburetor, droplets of fuel can separate and puddle when the air/fuel mixture turns corners. The end cylinders also tend to run leaner than the center cylinders in V8 engines with a carburetor. Some intake manifold designs do a better job than others of equalizing airflow and fuel distribution, but with multi-port EFI it is less of an issue. • Most bolt-on throttle body EFI kits can handle engines from 450 to 650 horsepower depending on the flow rate of the injectors and fuel pump that are used. With dual EFI throttle bodies, up to 1,200 horsepower is possible depending on the application. • EFI can also be used with turbochargers, superchargers and/or nitrous oxide. Programming allows the EFI control unit to adjust the fuel mixture and timing under boost pressure or when the engine receives a shot of nitrous. • Most throttle body EFI systems as well as some of the multi-port EFI systems are self-tuning and do not require a laptop or advanced computer skills to tune and adjust. For serious racing, the more advanced professional high horsepower port EFI systems do require a laptop and advanced tuning skills to dial in. The fuel mixture and ignition timing maps can be worked out on a dyno or with the engine in the vehicle – the latter typically results in a better tune because it takes into account the effects the transmission, drivetrain and exhaust system have on engine performance. The more sophisticated the control unit, the more data points it allows in the fuel and ignition maps. Most EFI conversion kits are “speed-density” systems that use engine speed, throttle position, air temperature and intake manifold pressure to estimate airflow into the engine. Some original equipment EFI systems are also speed-density systems (Chrysler and older GM Tuned Port Injection), but most are “mass airflow” systems that use an expensive MAF sensor mounted ahead of the throttle body to read airflow into the engine. MAF systems are more accurate but are also more sensitive to vacuum leaks and dirt contamination. Basic EFI Setup Procedure The initial setup of an aftermarket self-tuning EFI conversion system is fairly simple thanks to the plug-in handheld device that is provided with the kit. The device allows the EFI controller to be programmed with the basic setup information it requires to operate the system. This includes inputs such as engine displacement, number of cylinders, cam duration, fuel pump type (pulse width modulated with no regulator, pulse width modulated with regulator or non-pulse width modulated with regulator), desired idle RPM and rev limit. Some EFI conversion kits also have the ability to control ignition timing. If used this requires some additional inputs. Once the engine is fired up with its initial settings, the EFI controller starts to adjust the air/fuel mixture using a closed loop feedback signal from the oxygen sensor. The O2 sensor signal is used for short term and long-term fuel trim adjustments at various engine speeds, loads and throttle positions. This generates a map of what adjustments are needed to maintain the proper air/fuel ratio during various operating conditions, ranging from idle to part throttle to cruise to wide open throttle. It typically takes a couple of days of driving at various speeds before everything is really dialed in. From that point forward, adaptive learning will continue to fine tune the system as operating conditions change. Additional tweaks can be made on some systems with a laptop if further changes are desired. However… As Engine Builder contributor Bob McDonald recently reported (“Deep Breathing,” February 2015), as great as EFI is, it’s not always the perfect choice. There are some disadvantages to consider compared to a carburetor: • For old-school guys, computer controls, oxygen sensors and laptop tuning can be intimidating. If they are used to fiddling with a carburetor and have good carburetor tuning skills, they will usually stick with what they know rather than venture into the unfamiliar territory of EFI. These types of customers may be converted to EFI if they see the advantages EFI provides on somebody else’s engine. The self-tuning EFI kits also reduce the intimidation factor of converting a carburetor to EFI. • EFI requires installing an oxygen sensor in the exhaust manifold. Most kits include only one wideband O2 sensor. The sensor can be installed in either exhaust manifold or header collector on a V8 or V6 engine. This provides somewhat less than an ideal feedback because the sensor is only reading one side of the engine. Even so, the single O2 sensor setup simplifies installation and keeps the cost of the system down. OEM EFI systems always use separate oxygen sensors for each cylinder bank because it provides more precise fuel control. Installing the oxygen sensor requires drilling a hole in the exhaust manifold or header collector and welding or clamping a bung on the hole so the sensor can be screwed into the fitting. The sensor should be positioned with an upward slant (10 degrees or more) so exhaust moisture will drain back into the pipe when the engine is shut off. The basic idea is to position the O2 sensor so it reads the exhaust from all of the cylinders on that side of the engine. It won’t work with individual “zoomie” style headers because the sensor would only read one cylinder. This Avenger EFI Stealth Ram MPFI Fuel Injection System from Holley is designed for Small Block Chevy, 1995 and earlier heads, 36 lb per hour injectors, Range Up to 500 HP. Another requirement is that there must be some exhaust tubing beyond the exhaust manifold or header collector to prevent reversionary airflow between cylinder pulses from misleading the sensor. If air flows backwards into the collector where the O2 sensor is located, it can produce erratic or inaccurate readings that will upset the air/fuel mixture. Also, any air leaks (even small ones) at the exhaust manifold or header flange gasket or in the manifold tubing can mislead the sensor and upset the air/fuel mixture. • EFI requires installing an electric fuel pump, a simple, in-line, high pressure electric pump or an in-tank pump. Most EFI systems require a pump that can deliver 45 to 70 PSI. A low-pressure electric pump that is designed for a carburetor won’t work. In-tank pumps run cooler and quieter than in-line pumps, and are better protected from road hazards. But an in-tank pump is more of a pain to install in a vehicle that does not have an in-tank pump, and it makes pump replacement and service more difficult if the pump needs to be replaced at a later date. Return-less EFI systems have the fuel pressure regulator in the tank as part of the pump module assembly. This eliminates the need to install a separate return line to route fuel back to the tank from an external pressure regulator. However, if a customer is installing a return style EFI system, a return line is required. • EFI costs more than a carburetor. You can buy a carburetor for $400 to $1,500 depending on the size, style and modifications that have been made to the carburetor. A single throttle body EFI conversion kit,