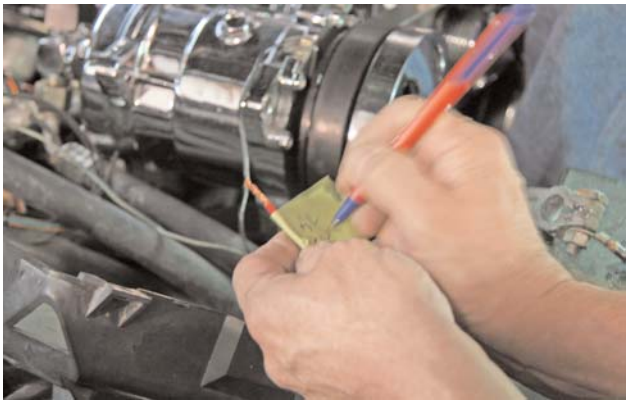
Second Time Around

The first thing you should always do is to disconnect the battery before the engine swap.



Guy also labeled all of the other wiring and connections such as alternator, oil pressure ,coolant temp and starter, ect. Take the time to label everything, even if you know you will remember it because these same wires will connect to the LS-2.

If you have been to the Street & Performance website and looked over the many install articles posted there, you probably recognize Tom Stotts '66 impala. In the last article where we installed the TPI unit onto his rebuilt 350 we said "This is the final step to complete a two year make over, Well... we were wrong. Tom works in sales at S&P and when someone called wanting a TPI engine and 700 R4, Tom sold his engine. One of Tom's friends had just installed an LS2 and it was making over 400 HP and getting over 24 miles to a gallon with a 6 speed. Tom found a burned LS-2 w/4L65E trans out of a 05 GTO. The intake manifold was destroyed but he knew that it could be replaced through S&P and everything else that he needed would also be available. So with the help of another friend named Guy, they decided to do the upgrade.

Guy unhooked all the wiring on the TPI unit & labeled them so that the new owner could easily install the engine into his own car.

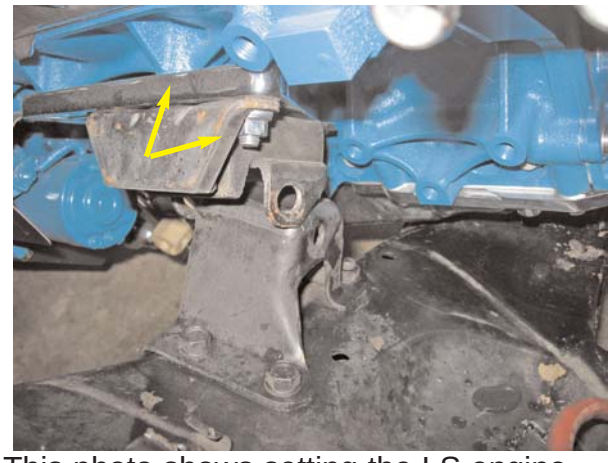
When taking the AC lines loose be sure to plug them to keep dirt and moisture out of the system. This is also a good time to change out the drier.

Even with fire damage of the top, Tom just had to replace some coils, the intake and injectors.

To solve the oil pan clearance problem, S&P offers the modified oil pan pictured at the top to clear the cross member. The bottom pan shows the difference between the two pans.A modified oil pick up tube is also needed with this pan. With the tube installed, you MUST be sure to knock the plug on the passenger side of the block for the dipstick tube out before bolting on the pan. The original GTO pan has the dip stick tube on the side of the pan because it is a front sump, all other GEN III have the tube in the block.
The pan and pickup tube are available from S&P outright or exchange.

The fixed yoke on the GTO's 4L65E had to be removed so that we could use his original 700 R4 slip yoke and drive shaft. S&P has a tail housing kit to run a manual speedometer, but Tom is going to use a Dakota Digital instrument cluster so he kept the stock 4L65E tail housing. The S&P harness will supply a signal connection for the electric speedometer.

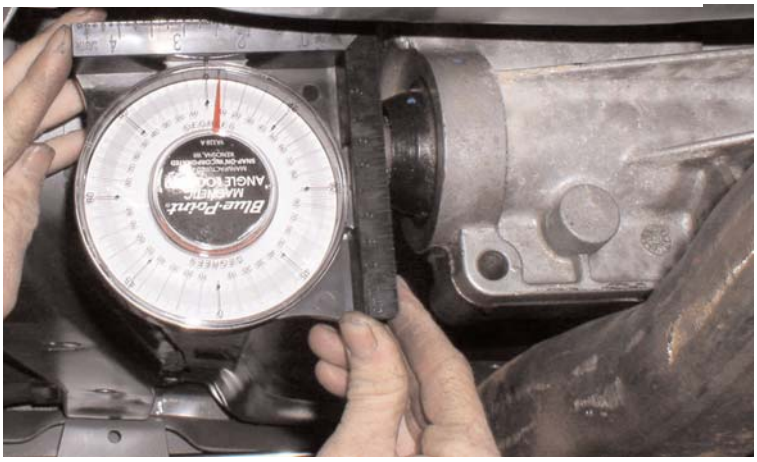
The burnt engine was painted and polished by S&P, then Guy installed the S&P engine plates which relocates the engine mounts back to the Impala's engine stands and installs the original Impala rubber motor mounts.

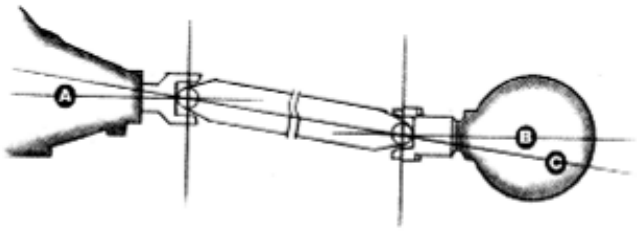


This photo shows setting the LS engine back to the Impala's original engine mount stands. Note that the arrows shows that the S&P motor plates move the original rubber mount forward into position.

Now with the pan on and the 4L60E transmission bolted up, we lowered the combination onto the front mounts for a final check of the pan clearance and to check the transmission cross member. We had to put a S&P modified pan for the 55-57 chevy to clear front cross member.

We found that we needed to relocate the rear trans mount tab. We simply cut it off and repositioned it. A Pioneer rear trans mount #622378 was used for the final installation. The crossmember bolted right back where the 700 R4 was.

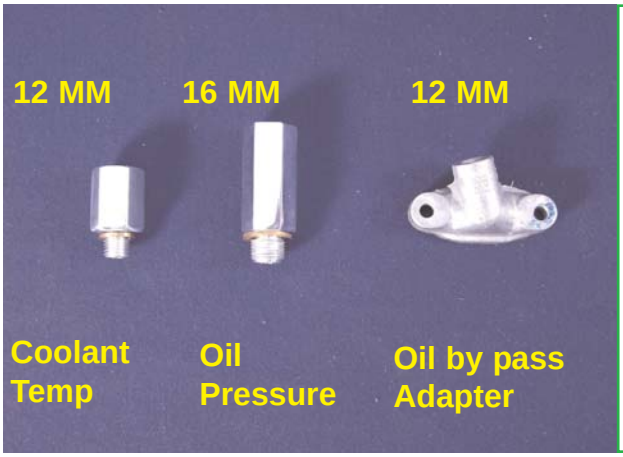




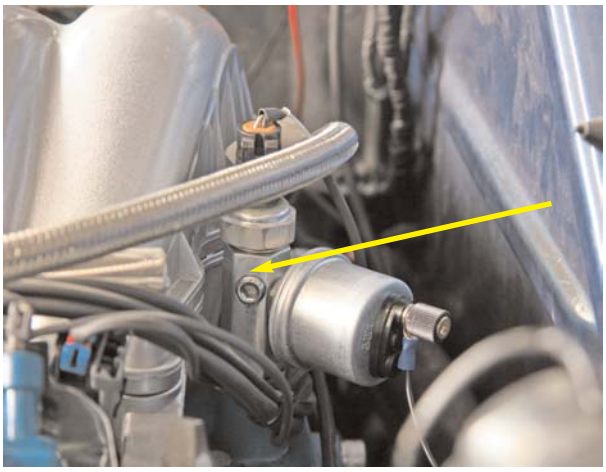
Drive shaft angle is important for strength and reliability. The transmission MUST be angled 1 to 5 degrees low on the yoke, but + or - 2 degrees is ideal for performance applications. To check the drive line, hold the angle finder against the tail shaft and locate the transmission mount bracket to the cross member.

The 12mm plug located at the rear of the passenger side head can be removed to provide a locating point to install a sending unit for your coolant gauge (VDO ECT.) The head can be drilled and tapped for a pipe thread or S&P can provide you with an adapter to go from 12mm to either female 1/8 to 1/2 pipe.

S&P makes these adapters in 12 mm for coolant, 16 mm for the oil pressure at the top of the block behind the intake, or the oil bypass adapter will allow you to install the sensor down by the oil filter. Note that the LS2 does not come with this style of adapter.

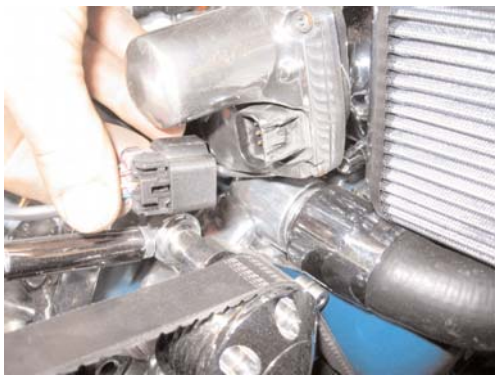


Coolant
12mm x 1/8 NPT
12mm x 1/4 NPT
12mm x 3/8 NPT
12mm x 1/2 NPT
Oil
16mm x 1/8 NPT
16mm x 1/4 NPT
16mm x 3/8 NPT
16mm x 1/2 NPT
By Pass



Using S&P 16 mm x 16 mm x 1/8 NPT adapter allows use of th LS2 oil pressure sending unit and the sending unit for the Dakota Digital gauges. This can also be used with an oil by pass adapter located by the oil filter.

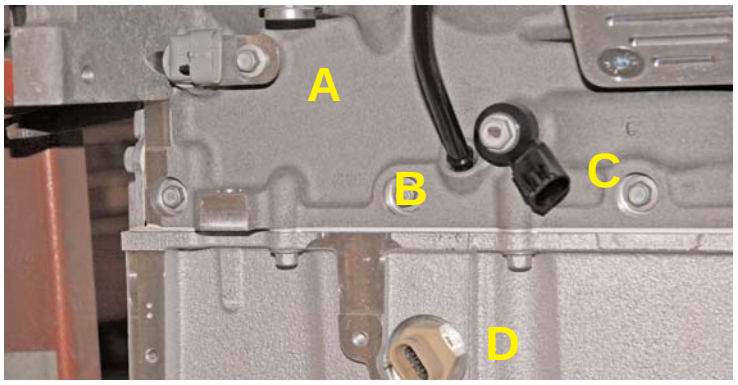
This coolant sensor located on the front of the driver side head is used by the computer only. This is where the coolant temp plug on the harness must be plugged in.



We installed the S&P engine/trans harness. This harness plugs into the needed sensors on the engine and trans, then there are only four wires to connect, one for the key, one to the starter, one to the fuel pump and one to ground. The photos above show plugging in the air temp sensor, drive by wire and the coils. The harness comes with complete instructions and you can also download the instruction sheet from S&P's website.

NOTE: With any injection system, GROUNDS are very important, you must ground the battery to the

Cam Sensor is located in timing chain cover on driver side under waterpump. Earlier GEN III were mounted on the top of the block behind the intake to the right of the oil pressure sensor.

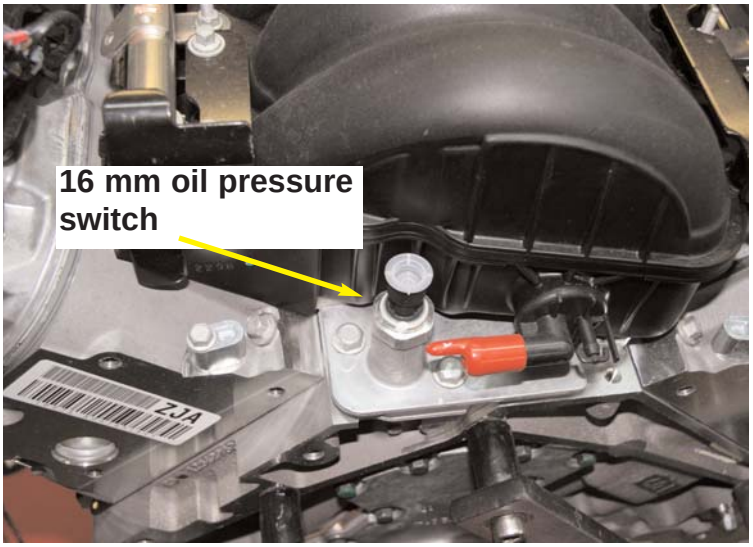


A. Crank Sensor. (gray sensor is a 58 tooth & Black is for a 24 tooth)

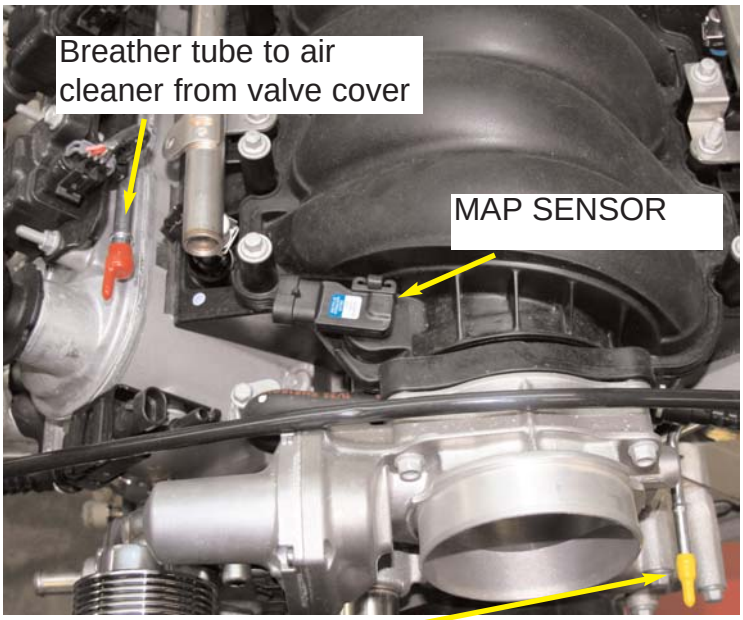
B. Engine dip stick location, This is were the plug is located on GTO that must be removed to use a oil pan other than GTO Original.

C. Knock sensor, One on each side of engine, earlier engines are located under intake in valley pan.

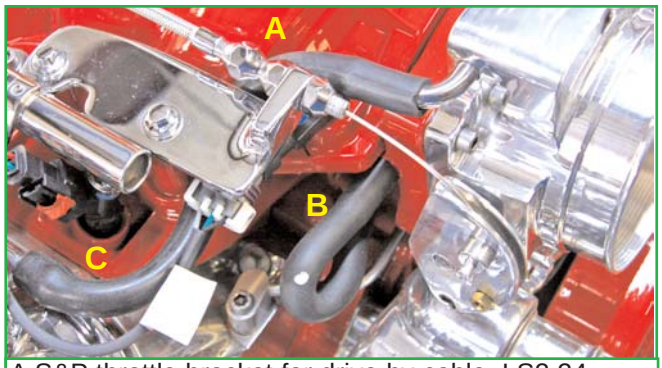
D. Oil Level Sensor



Red cap is on the large vacuum port for use on the power brakes, the small port to the right is for heat, AC, Etc.

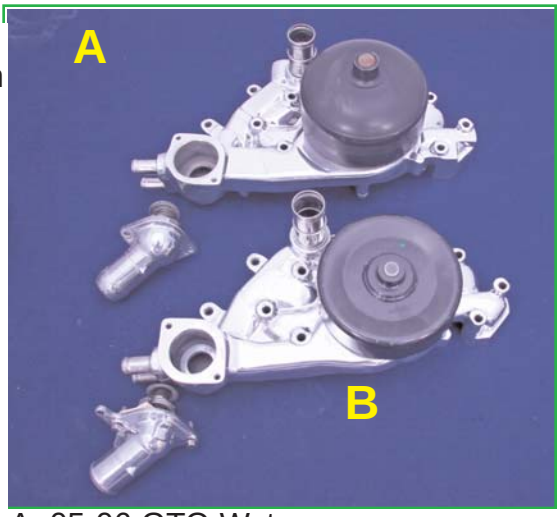


The steam line needs to be routed to the upper radiator hose or the radiator. It can also be tapped back into the water pump

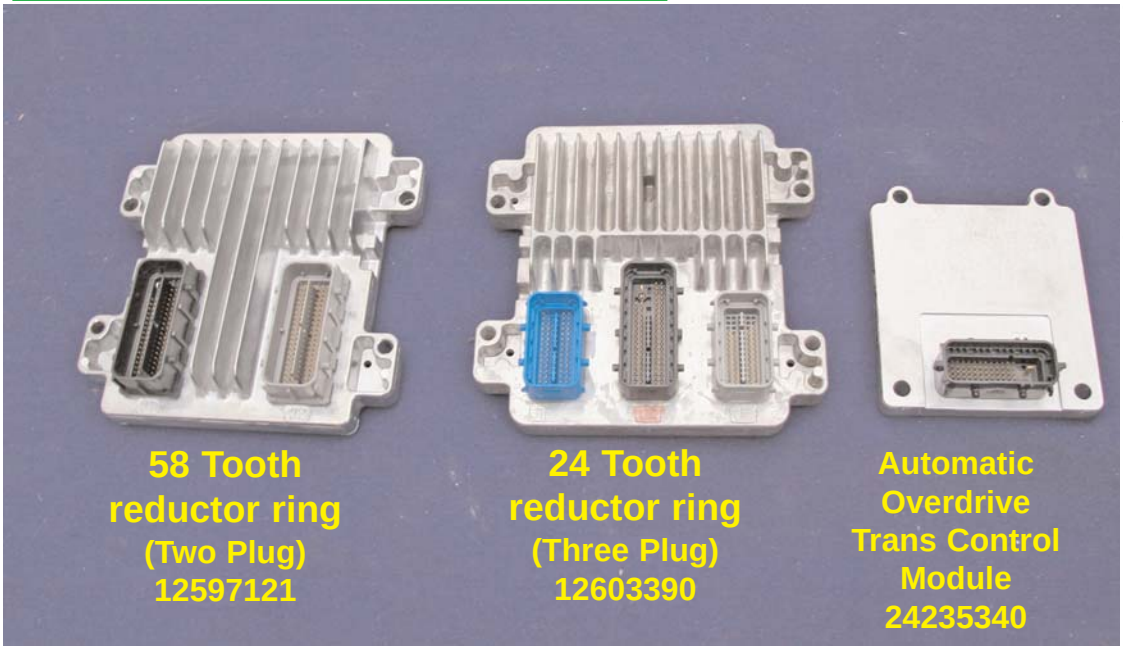


A.S&P throttle bracket for drive by cable. LS2 24 tooth reductor ring engine can be converted back to drive by cable by using an earlier computer and knock sensor. B. PCV hose from valley pan to port on intake. C. Valve cover breather tube to top of drive by cable throttlebody. LS2 throttlebodies bolt on with four bolts and earlier one use three bolts.

Corvette waterpumps are 1 3/4" shorter than GTO's. Corvette balancer is 3/4" closer to the motor than the GTO. SSR and Trail Blazer balancer is 1 1/2" closer to the radiator than the Corvette. SSR & Trail Blazer uses the same balancer & waterpump as trucks. 05-06 CTS Cadillac is the same as Vette.



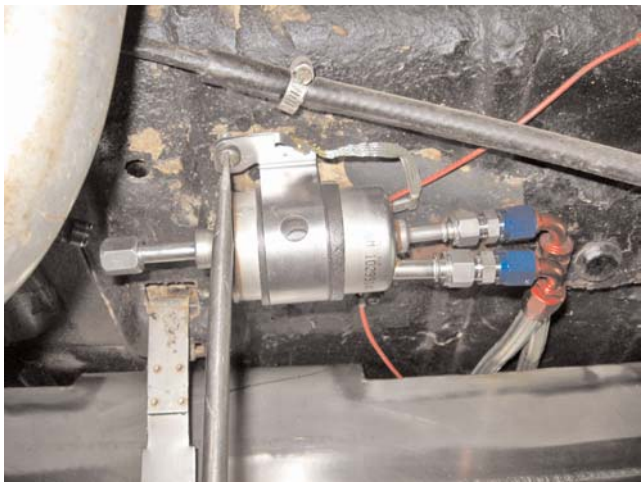
A. 05-06 GTO Waterpump
B. 05 up Corvette



The 24 tooth reductor ring computer 12603390 is used on 05-06 GTO's, 05 LS2 Vette, 05-06 SS Trail Blazer and 05-06 SSR Pickup.

The 58 tooth reductor ring computer 12597121 is used on 06 LS2 Vettes, 07 SS Trail Blazers.

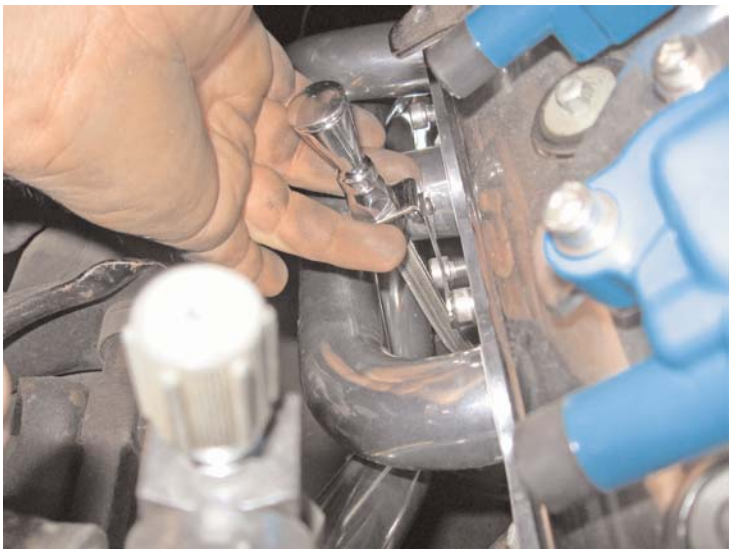
After making all the engine connections we plugged into the computer and located where we could mount the computer with the given length of the harness. The S&P harness can be ordered in custom lengths. In our case Tom will be using his car to help test computers that have been reprogrammed by S&P so we mounted it on the inner fender for easy access. This photo shows that the TCM, PCM and fuel pump relay are mounted side by side. The PCM measures 6.5 x 6.5 x 2 and the TCM measures 4 x 4.5 x 1.5 so that they can be placed almost anywhere. However keep in mind that you will want to have easy access to them. The computer will have to be reprogrammed to remove the anti theft and the correct tire diameter and gear ratio will have to be programmed into the TCM. S&P can supply this service for you.

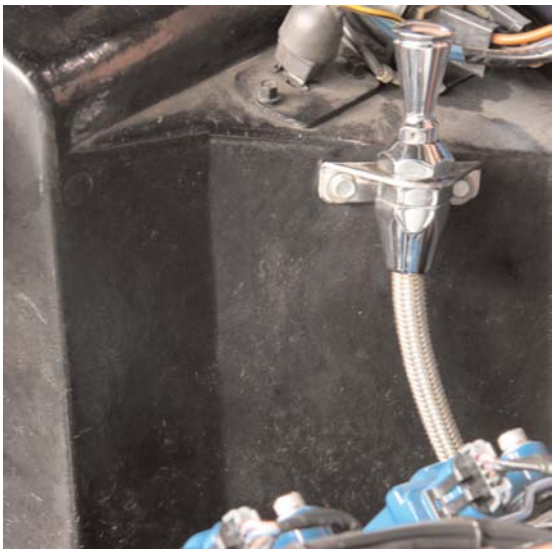


Fuel tank with intake pump and lines were already installed from the TPI conversion, But the filter needed to be changed to a 99 up GM fuel filter regulator to match up to the single line fuel rail on the LS2.

A S&P single fuel line is run from the filter/regulator to the LS2 single fuel rail under the cover. Smooth S&P covers will cover the fuel line and add a cleaner look. S&P also has the through the cover fuel line when using the factory Vette or GTO Cover.

S&P chromex thermal coated headers (inside and out) were used to help keep the heat down under the hood. These headers also have a O2 bun on each collector for the heated oxygen sensors . Taylor custom LS1 spark plug wires were used to have clearance between the headers and the heads.

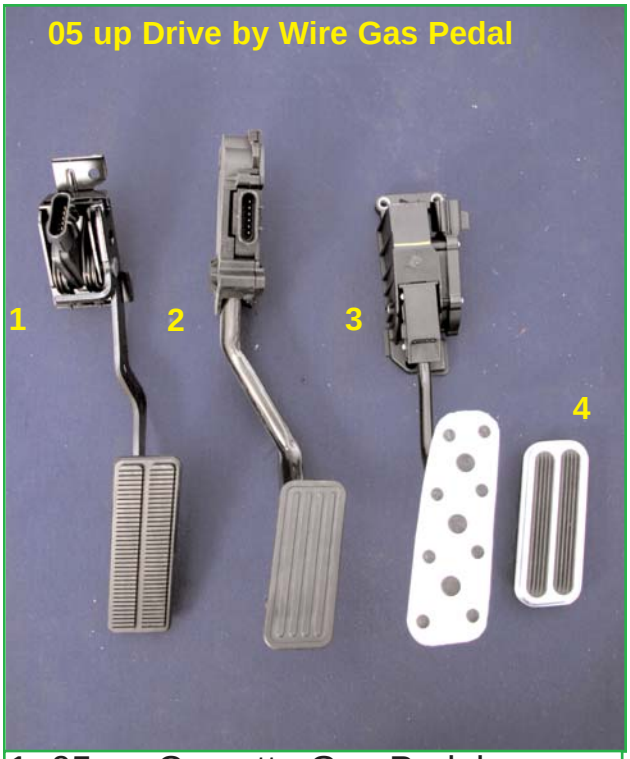




Left we install Lokar's ED-5008 Engine dipstick chromed by S&P.
Right the Lokar firewall mount trans dipstick TD-34L60EFM also chromed by S&P

Since Tom was not able to get the gas pedal from the burnt vehicle, he used a 05 Vette gas pedal, it seemed to fit the floor and firewall combination of the Impala better. Keep in mind when looking to buy an engine from a wreck you need to get the MASS AIR FLOW, PCM, TCM IF AUTOMATIC, FRONT OXYGEN SENSORS, REAR O2's FOR AN EMISSION LEGAL APPLICATION AND GAS PEDAL. If you can not get all or part of these, S&P can provided you with what you will need..

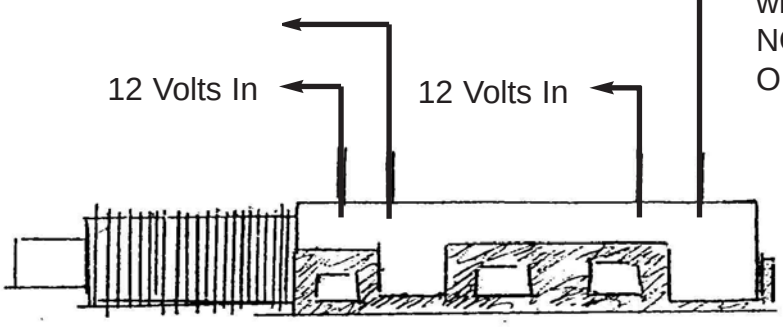
Brake wires will have to be hooked up before the electric throttle will operate. Check your LS2 instruction sheet or www.hotrodlane.cc online tech.



1. 05 up Corvette Gas Pedal
2. 05-06 SSR Gas Pedal
3. 05-06 GTO Gas Pedal
4. Lokar GTO Gas Pedal Pad

For brake light
12 Volts with brake on ONLY

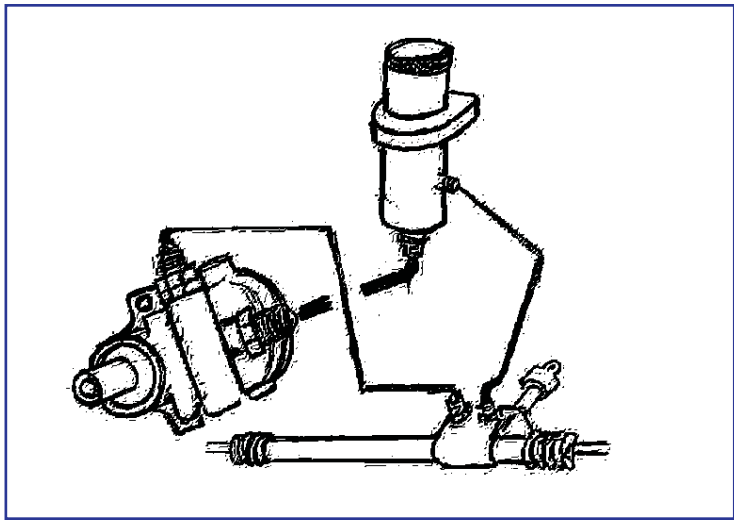
Hook to red brake wire
12 Volts ALL THE TIME
with brake OFF.
NO VOLTAGE WITH BRAKE ON!



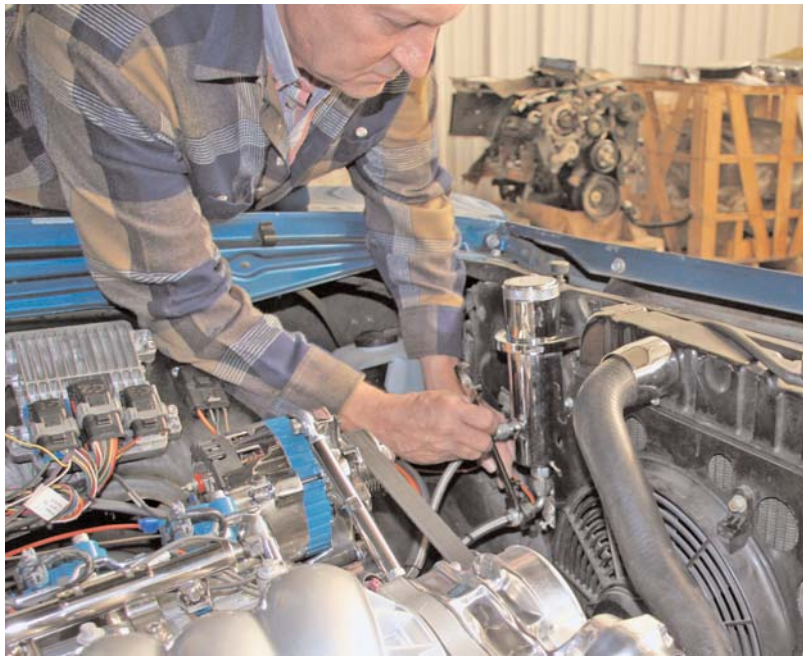
GM Brake Switch #25524845
AC Delco #D850A

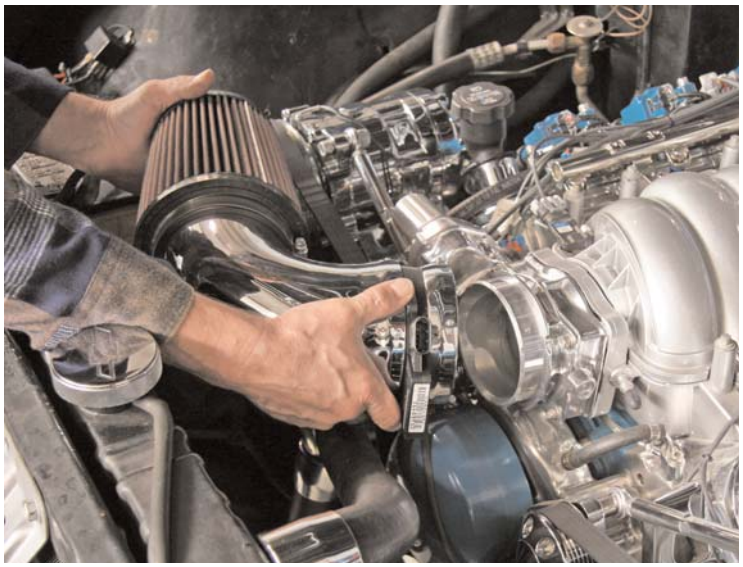
The Impala's original radiator was used which already had dual electric fans mounted to it. Install on the engine is a S&P 360/15 waterneck and a lower radiator hose Gates #20573. Upper radiator hose Gates #21087 had to be used to go to the driver side because of the original small block radiator. Tom wanted to keep the original radiator to keep the cost down and the small block radiator will keep the GEN III engine cool.

S&P Stainless trans lines were used to connect the new 4L65E to the radiator.

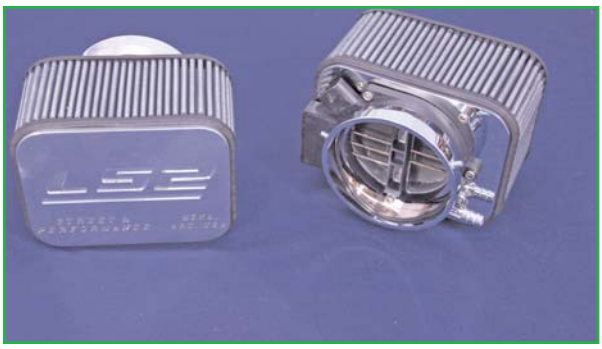


The S&P remote power steering reservoir from the TPI installation was used in the LS2 installation. The Impala's original gear box uses 5/8 an 11/16 inverted flair fittings. You MUST use aero-quip FTE series #8 hose which is rated for vacuum and will not collapse from the pump's suction. Regular pressure hose can be used on the two lines, one from the pump to the gear box and one from the gear box to the side of the reservoir. S&P recommends using GM power steering fuilid GM12345867 or Valvoline Pyroil.



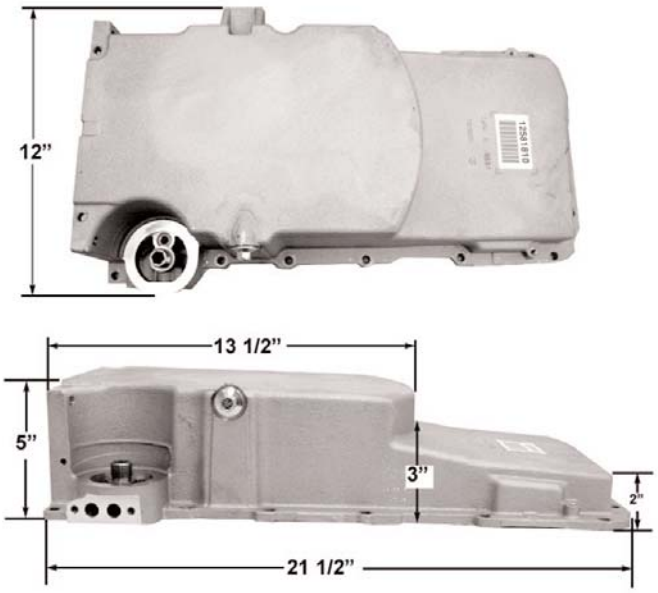


Tom used the S&P 90 degree elbow which has a fitting for the breather hose from the passenger side valve cover. The elbow also has a provision for the 5 pin MASS AIR FLOW sensor. Earlier LS1's and GTO's used an 3 pin MASS AIR FLOW Sensor with a separate air temp sensor. The MASS AIR FLOW sensor can be installed at the throttlebody or between the elbow and filter.

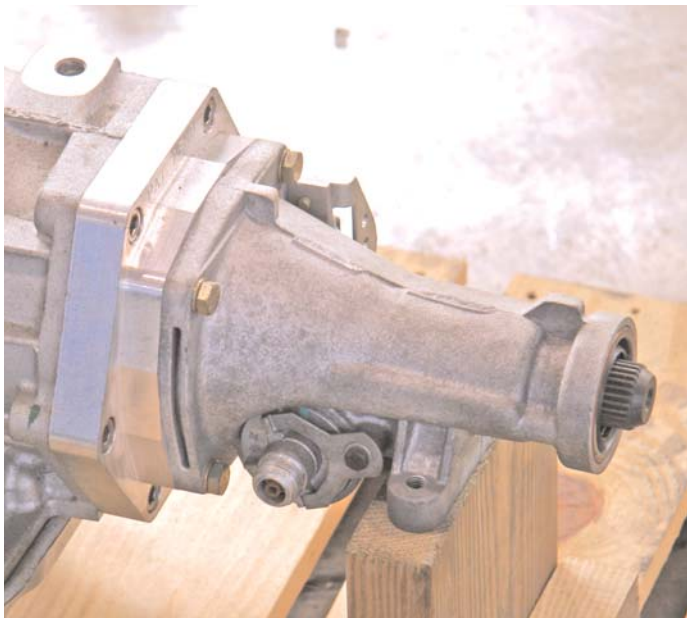


Another option is the S&P air cleaner that incorporates the MASS AIR FLOW sensor into the rear half of the filter housing along with a breather tube fitting. Your MAF must be sent to S&P so that it can be machined to fit to the air cleaner housing.

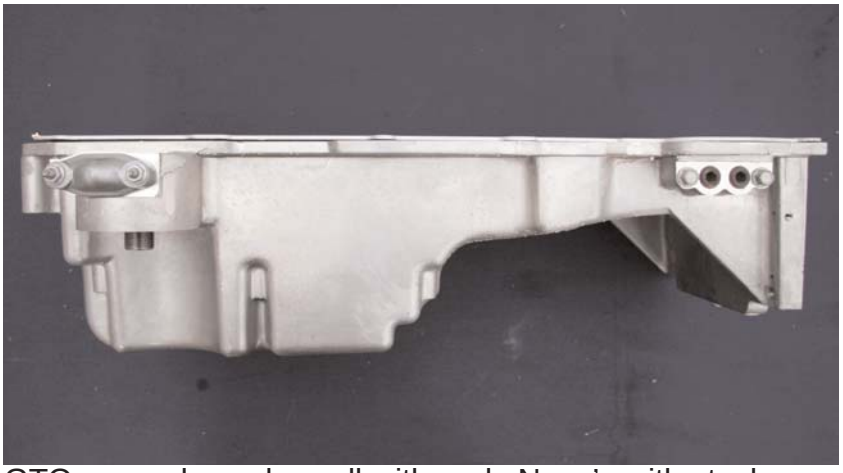
Tom installed Dakota Digital instruments into the Impala's dash, A very detailed instruction sheet is provided with this cluster for installation and calibration.



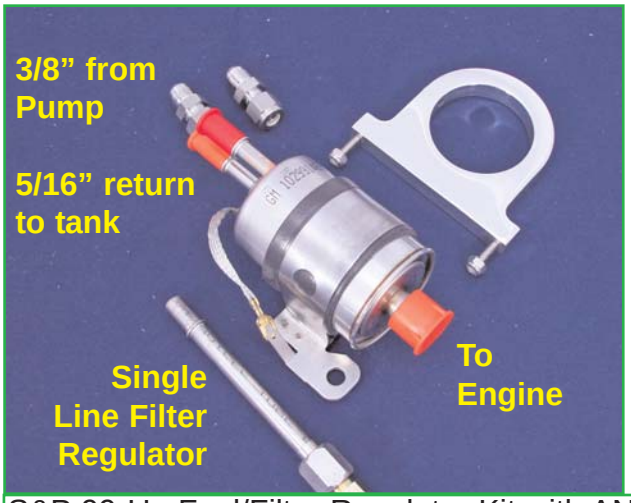
Corvette Oil Pan, fits good in early Vettes with C4 suspension and street rods.



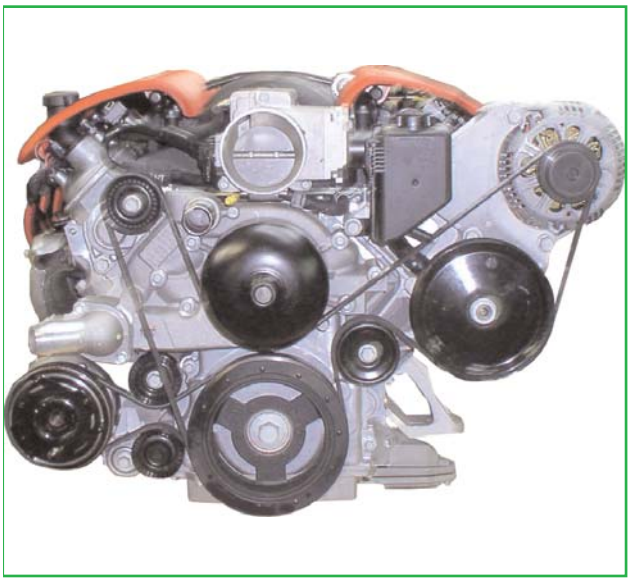
S&P 6 bolt tail housing kit, allows the use of an electric VSS and manual speedometer.



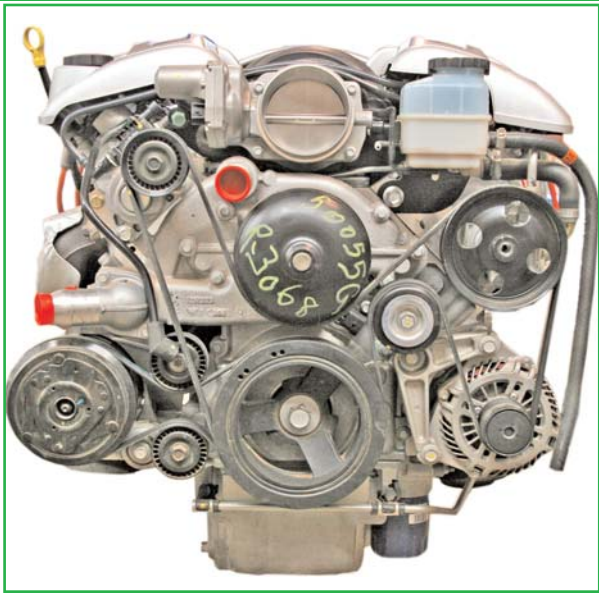
GTO pan only works well with early Nova’s with stock suspension and front sump pan.



S&P 99-Up Fuel/Filter Regulator Kit with AN6 adapter fittings



97- Up Corvette Factory Accessories



05-06 GTO Factory Accessories