

TECHAFX

# HOSE RELOCATION KIT



Photoinstructions



for  
GM 2010  
& Later  
Chevrolet  
Camaro

LS3 & L99

**V8**  
ENGINE

## Includes:

- Removing Stock Components
- Installing TechAFX Hose Relo Kit
- Bleeding Coolant System
- Install New Coil Covers



# LOOK. DO. DONE.

*Each Whaba page shows you how:*

**Title:** Describes step of installation process

**Tool Icon:** Shows tools to use (descriptions in Milestones & Icons Section)

**Color Photo:** Super crisp action image shows work to do

**Parts Needed:** When needed, parts are listed here

**Work Location Icon:** Shows where work is performed (icon descriptions shown in the Milestones & Icons Section)

**What To Do:** Explains exactly how to perform step

## 2-4 Position TechAFX Heater Hose Assembly



- What to do:**
1. Rotate Assembly into car position (shown)
  2. Position hose ends near fittings



### Helpful Hint:

You now have the TechAFX Heater Hose Assembly in its final position, the ends need to be installed on the water pump and heater core fittings to complete its installation

**Helpful Hint:** Insider-info to make the task easier/quicker/better

**Buy the  
Hose Relo Kit at  
TechAFX.com**

**Whaba**  
"WE MAKE EXPERTS®"

*For Off Road Use Only*

# Get Rid Of Those Ugly Hoses!

**Clean up the look of your LS V8 engine with a TechAFX Hose Relo Kit**

## BEFORE



The TechAFX Hose Relo Kit improves the look of the LS V8 by moving the Heater, Fuel and EVAP hoses off the top of the engine

*TechAFX  
Hose Relo Kit  
pn 110110*

## The Product Development Team At TechAFX

is constantly developing new products to offer our customers. Our easy-to-install Hose Relo Kit is a perfect example of our commitment to provide the high quality systems you need today!

## AFTER



**Get Easy-to-install, Factory Quality Products At:**  
***techafx.com***

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# **Find Everything You Need To Know... Fast!**

## **Removing Stock Components**

How to properly remove the stock hoses, rotate the fuel rail and prep for the TechAFX Hose Relo Kit

## **Installing TechAFX Hose Relo Kit**

How to quickly install the TechAFX heater, fuel & EVAP hoses installed on your 2010 & later LS V8 Camaro

## **Bleeding Engine Coolant System**

Learn the 'easy way' to bleed the air out of your cooling system & add beauty covers

## **Milestones, Icons, etc.**

Quickly find key steps in the process and descriptions for the Whaba® Tool and Work Location Icons



# Tools Required to Complete TechAFX Hose Relo Kit Install:

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**Box Knife** (*or razor blade*)

**Drain Pan** (*3 gallon, low-rise style*)

**8 & 10mm Deepwell Sockets**

**3/8 inch Ratchet Wrench**

**3/8 inch Torque Wrench** (*in-lb*)

**Socket Extension, 6 inches, 3/8 inch Drive**

**Long Nose Pliers** (*or ratcheting clamp pliers*)

**Regular Pliers**

**Hose Hook Tool, 90°**

**Hose Hook Tool, 180°**

**Pry Tool** (*for clips*)

**Vacuum Cleaner**

**Water Spritz Bottle** (*or just a watter water bottle*)

**No-Spill Radiator Funnel** (*Lisle pn 24610*)

**Screwdriver** (*flat*)

**GM Quick Disconnect Release Tool Set** (*Lisle pn 39400*)

*(Needs to include: 5/16 and 3/8 inch tools)*

**Rags**

**STOCK**

# **HOSE REMOVAL**

**Photoinstructions**



**Goal of  
Section:  
Stock  
Heater,  
EVAP &  
Fuel Line  
Removed  
From  
Vehicle**

**Helpful Hint:**

*Take a good long look at your ugly engine—  
it is soon to look beautiful!*

# Finish Off Your LS V8 With These Cool Covers!



*Order  
These  
Lingenfelter  
Coil  
Covers*

***Install Color-Matched  
Lingenfelter LS V8 Engine  
Coil Covers On Your Relo  
Kit-equipped Camaro!***

***Order from [Lingenfelter.com](http://Lingenfelter.com)***

*For Off Road Use Only*

# Open side door

1-1



## What to do:

1. Unlock vehicle
2. Pull out on door handle
3. Open door

## Helpful Hint:



Whaba Pat. Pend.

*Vehicle and engine **MUST** be at room temperature and engine not been run for at least 6 hours—to minimize coolant and fuel pressure in systems when performing work on vehicle*





### What to do:

1. Reach under dash on driver side
2. Locate hood release lever
3. Pull back and down on lever until hood pops



### Helpful Hint:



*The TechAFX Hose Relocation kit requires removing the factory heater hose assembly, fuel line assembly & EVAP line, then rotating the hood rail and rotating the fuel rail 180°—all of this work can occur under the hood of a Camaro in a driveway or garage*

Lift hood up (pull lever under front of hood)

1-3



### What to do:

1. Reach into space between hood and valence
2. Push secondary release to driver side 
3. Pull up on hood to lift fully 



Whaba Pat. Pend.

### Helpful Hint:

*The secondary release is accessed through the small space between the hood and valence after it has been 'popped' from inside the car. You will need to push the release over about 2 inches to open the hood*

## Check that engine is LS V8



### What to do:

1. Inspect that vehicle has LS engine
2. Look at heater hoses for lettering



Whaba Pat. Pend.

### Helpful Hint:

The best way to determine you are looking at an LS3 or L99 V8 powered Camaro is by looking at the heater hose outlet/inlet hoses: they will have 'ENG V8' marked on them if the vehicle is V8-powered



# Begin process to disconnect battery

1-5



## What to do:

1. Pop trunk with key fob
2. Lift floor carpet
3. Fold carpet over, forward



Whaba Pat. Pend.

## Helpful Hint:

*Disconnecting the battery is a good safety precaution to take every time you work on your vehicle—and it is easy and quick to do once you see how*



## Unthread plastic cap off



### What to do:

1. Rotate cap 
2. Once loose, set to side in trunk



Whaba Pat. Pend.

### Helpful Hint:

*This should not be more than slightly tight (take note of that when reassembling!)*

# Remove trunk floor panel

1-7



## What to do:

1. Lift trunk floor panel out of trunk
2. Store in safe location for reinstallation



Whaba Pat. Pend.

## Helpful Hint:

*This is just a pressed foam component, so store it in a place where the chances of it getting 'crushed' by something heavy are minimized*



### What to do:

1. Lift up on foam component
2. Store in safe area



Whaba Pat. Pend.

### Helpful Hint:

*The 2010 and later Camaros do not have a spare tire on board—just this fix kit in the trunk area. Make sure this gets reinstalled after you do the TechAFX Hose Relo upgrade*

# Remove battery ground from battery

1-9



## What to do:

1. Loosen nut on ground wire (shown)
2. Lift connector off battery
3. Wrap battery ground end with rag



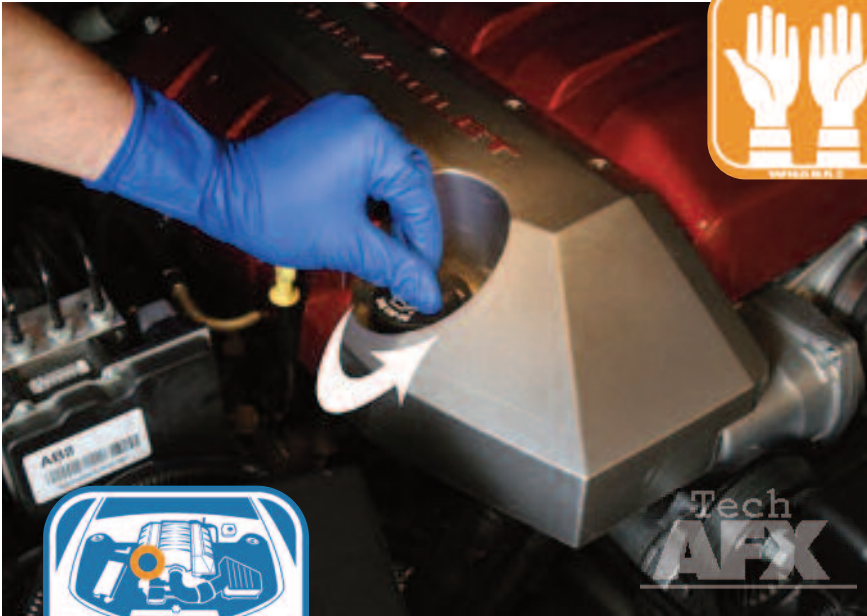
Whaba Pat. Pend.

## Helpful Hint:

*Leave this disconnected the entire time you are performing the work on the Camaro*



## Unthread fill cap



### What to do:

1. Locate fill cap
2. Twist fill cap  to release
3. Remove fill cap, store for reinstall



Whaba Pat. Pend.

### Helpful Hint:

*The oil fill cap is the front holddown for the large 'snowsled' engine cover, so it needs to be removed to lift the engine cover off*

# Remove large plastic engine cover

1-11




## What to do:

1. Lift engine cover at front approx. 3 inches
2. Pull on engine cover to release from clips
3. Store in safe location



Whaba Pat. Pend.

## Helpful Hint:

The 'snowsled' cover mounts on a plastic bracket —if you don't reuse this cover with the TechAFX Hose Relo kit, the bracket can be tossed (along with the stock heater hoses, EVAP & fuel lines that lay on top of the engine)



### What to do:

1. Place oil cap back on fill tube
2. Thread onto engine ↻ hand tight



Whaba Pat. Pend.

### Helpful Hint:

*The factory engine cover does not need to be reused with the TechAFX Hose Relo kit—you could put it back on but why? (we recommend tossing it as the LS V8 is too cool to cover with this abomination)*

# Who Is Dr Whaba?



*He's the one  
showing you  
through the  
'roadblocks'*

**Dr Whaba Is...**

**EXPERIENCED**

*He knows the mistakes  
and shows how to avoid  
them*

**EFFICIENT**

*His instructions will  
SHOW you what to do  
with photos, icons and  
minimal text*

**SUCCESSFUL**

*Enthusiasts know  
his accurate, elegantly  
simple instructions are  
the required resource for  
success*





## What to do:

1. Locate radiator petcock under vehicle
2. Clean drain pan of liquid and solid materials
3. Slide **CLEAN** drain pan under bumper



Whaba Pat. Pend.

## Helpful Hint:

*This can be performed with the vehicle on the ground if it is at stock ride height and you use a drain pan that is 5 inches tall (or shorter). You will only have about 1.5 inches of coolant in a 4 gallon drain pan if this is done correctly*

# Position drain pan under petcock

1-14



## What to do:

### 1. Position drain pan under radiator petcock



Whaba Pat. Pend.

## Helpful Hint:

*ENGINE MUST BE AT ROOM TEMPERATURE WITH NO PRESSURE IN COOLING SYSTEM! Do not work on vehicle if engine has been operated recently. Wait 12 hours after vehicle has been run.*



### What to do:

1. Rotate petcock 360 degrees to open ↻
2. Let drain approximately 5 minutes



Whaba Pat. Pend.

### Helpful Hint:

*TIP: On a room temperature coolant system, remove the radiator cap on top of radiator to increase flow of coolant out of coolant system (How to Remove cap: Rotate ↻ slightly, push down, rotate further ↻, lift off)*

Finish draining approx 1 gallon coolant

1-16



### What to do:

1. After 5 min., rotate petcock valve 360° 



Whaba Pat. Pend.

### Helpful Hint:

*You use a CLEAN drain pan so you can reuse the coolant after doing this swap*



## What to do:

### 1. Reinstall radiator cap



Whaba Pat. Pend.

### Helpful Hint:

*There should be at least an inch or more of coolant in your 4 gallon drain pan—make sure to keep this covered when not draining coolant in it so you can reuse this coolant after the TechAFX Hose Relo kit is installed*





## What to do:

1. Push drain pan under water pump heater hose outlets



Whaba Pat. Pend.

## Helpful Hint:

*The heater hoses will be removed from the vehicle next, and this will result in some coolant draining out of the engine, so the drain pan needs to be placed under this area*



### What to do:

1. Brace right hand against air cleaner tube
2. Pull on hose with left hand
3. Leave hose hanging in place



Whaba Pat. Pend.

### Helpful Hint:

*This is removed to allow the removal of the stock (and ugly!) heater hose assembly*



## What to do:

1. Compress clamp ends together
2. Wiggle clamp down hose 2 inches
3. Release the hose clamp ends



Whaba Pat. Pend.

## Helpful Hint:

*The factory & TechAFX hoses are held in place with metal tension clamps that are relaxed with pliers or a set of ratcheting clamp pliers—buy them @ [techafx.com/tools](http://techafx.com/tools)*

## Remove hoses from water pump fitting



### What to do:

1. Wiggle hose pry tool under end
2. Pull hose off fitting, drain coolant
3. Repeat clamp move/pry/remove on other hose



Whaba Pat. Pend.

### Helpful Hint:

*The coolant that drains from this hose assembly will come out quickly, but should be limited in volume—point each hose down @ drain pan when it comes off fitting*





## What to do:

1. Follow length of heater hose to the firewall
2. Note where clamp tangs are 'clocked'



Whaba Pat. Pend.

## Helpful Hint:

*Compressing these clamps, sliding them down the hose to get them off the fittings and freeing the hose from the heater core fittings is by far the most challenging aspect of this upgrade: but it is do-able—just be patient!*





### What to do:

1. Pinch clamp ends together
2. Wiggle clamp around , down the hose 
3. Release clamp ends



Whaba Pat. Pend.

### Helpful Hint:

*The clamps have a tendency to 'cock' on the hose if you try to pull them straight back: rotating the clamp around the hose about 45° back and forth while slightly wiggling it rearward will make this go easier*



## What to do:

1. Wiggle hose pry tool under end ↻



Whaba Pat. Pend.

## Helpful Hint:

Work the tip of the hook tool around the circumference of the hose to separate it from the fitting

## Pull hose loose from heater core fitting



### What to do:

1. Pull hose off fitting, drain coolant



Whaba Pat. Pend.

### Helpful Hint:

*The coolant that comes out of this hose assembly should be small*



### What to do:

1. Pinch clamp ends together
2. Wiggle clamp down the hose
3. Release clamp ends



Whaba Pat. Pend.

### Helpful Hint:

*The second hose should be a little easier to work with as you will have a little more room to access the hose clamp and hose, and you will have some experience removing a heater hose from the heater core fittings*





### What to do:

1. Pull hose off fitting, drain coolant
2. Tilt hose to drain remaining coolant into pan
3. Set hose assembly aside



Whaba Pat. Pend.

### Helpful Hint:

*The coolant dump from this hose assembly will be very slight—if any at all. Congrats, you have removed one very ugly heater hose assy from your car!*





## What to do:

1. Unthread nut from engine
2. Lift bracket off engine
3. Set aside



Whaba Pat. Pend.

## Helpful Hint:

*This, and the ugly, plastic 'snowsled' engine cover will not be reused (thankfully)—the next step to prep for installing the TechAFX Hose Relo kit is to rotate the intake manifold fuel rail: to do this, the intake will be removed from the engine (Steps 1-29 to 1-71 will detail this process)*



### What to do:

1. Remove bolt
2. Lift bracket off intake
3. Reinstall bolt hand tight





Whaba Pat. Pend.

### Helpful Hint:

*This bracket holds the factory fuel hose that runs over the top of the engine—the bolt will be torqued in place when making the final installation of the TechAFX Hose Relo kit*



## What to do:

1. Unthread black plastic cap  (fingers)
2. Place rag under and over Schrader valve
3. Carefully push to release valve 



Whaba Pat. Pend.

## Helpful Hint:

*The fuel might be under a lot of pressure: so hold the rag over the valve when releasing the pressure to capture it—dispose of the rag appropriately*



### What to do:

1. Place rag under QD fitting mating point
2. Lift clip on fuel line side of attachment
3. Slide clip toward intake, remove & save



### Helpful Hint:

*QD = Quick Disconnect; also, the 'secondary' clip being removed in this step can be reused with the TechAFX Hose Relo kit, so make sure to save it & install later to maintain the factory safety factor*





## What to do:

1. Place the 3/8" tool on the fuel rail tube



Whaba Pat. Pend.



## Helpful Hint:

*This tool is part of a set of GM-style QD release tools available @ [techafx.com/tools](http://techafx.com/tools)—and they work great: so you don't need to spend a ton to have a good set of GM QD release tools*





### What to do:

1. Push QD fitting toward fuel rail 
2. Pull release tool into QD fitting 



Whaba Pat. Pend.

### Helpful Hint:

*Pushing the release tool & fitting together lifts four (4) metal tangs inside the fitting out of the way which allows the fitting to be slid off the hardline tube - expect a little fuel to drain out*



## What to do:

1. Gently pull fitting back until off fuel rail
2. If stuck, push fitting/tool together more
3. Wiggle, then separate QD fitting/tool



Whaba Pat. Pend.

## Helpful Hint:

*We have found this can be a little frustrating the first time you do it as it takes a little finesse, but once you do it, you will understand how to release the lock tangs on the QD fitting and the next time it will go a lot easier*



## What to do:

1. Lift up on plastic clip to release from fuel rail




Whaba Pat. Pend.

## Helpful Hint:

*Just getting rid of the stock fuel hose will make a huge improvement in the look of the LS V8 engine in your Camaro! We are close to tossing it*



## What to do:

1. Lift up on hose to release from clip 



Whaba Pat. Pend.

## Helpful Hint:

*This black clip can be removed if you want, but most just leave it on the wiring loom as it is not really visible once the TechAFX Hose Relo kit is installed*

## Remove secondary QD clip on fuel hose



### What to do:

1. Pry clip off hardline tube (as shown)
2. Slide clip downward  $\frac{1}{4}$  inch ↴
3. Pull clip off tube, store for reinstall



Whaba Pat. Pend.

### Helpful Hint:

*Save this clip! They are an excellent design that works with the TechAFX Hose Relo kit fuel line*





## What to do:

1. Clip 3/8 inch QD release tool on (as shown)
2. Pull tool up,  push fitting down 
3. Pull fitting up  to separate, remove tool



Whaba Pat. Pend.

## Helpful Hint:

*You might want to place a rag under this area as some fuel will probably drain out of the hose when this is released*

## Remove factory fuel hose assembly



### What to do:

1. Lift factory hose off engine
2. Remove from vehicle



Whaba Pat. Pend.

### Helpful Hint:

*Hold rag under lower fitting when removing from engine bay to minimize chance of dripping fuel on the body—good work! Getting rid of this hose helps to clean up the Camaro engine bay a ton!*



## What to do:

1. Push white clip in on EVAP fitting 
2. Gently pull up on fitting 
3. Release completely from EVAP solenoid



Whaba Pat. Pend.

## Helpful Hint:

*These fittings look odd when you first encounter them, but they are actually quite straightforward: push the plastic tab in about 3 mm and the connector can be wiggled up off the fitting*



## What to do:

1. Follow hose down to metal QD fitting



Whaba Pat. Pend.

## Helpful Hint:

*This is a high tech, expensive hose assembly with an important job: unfortunately, it is way too ugly—thankfully, the TechAFX Hose Relo kit replaces this kludged-up piece with a good looking, factory-quality hose assembly*





## What to do:

1. Install 5/16 inch release tool as shown
2. Push down ↓ on fitting, pull up ↑ on tool
3. Pull up ↑ on fitting to separate from tube



Whaba Pat. Pend.

## Helpful Hint:


*There are two metal hardline tubes mounted on the body structure of the 2010 Camaro: one is the fuel line, the other is the vent for the gas tank—this hose is on the vent tube*



## Pry wiring clips off injector rails



### What to do:

1. Place pry tool between clip/bracket
2. Pry clip out of bracket 
3. Release all four clips around engine




Whaba Pat. Pend.

### Helpful Hint:

*These clips are just taped into the wiring loom and will be reinstalled in the fuel rail clips, so get the pry tool tip between the bracket/clip to separate them cleanly: that way they can be reused*



## What to do:

1. Push green redundant clip up 2 mm 
2. Repeat for other 7 injectors



Whaba Pat. Pend.

## Helpful Hint:

*Do this step on the 8 electrical connectors situated around the top of the engine at the 8 fuel injectors—these connectors need to be removed as part of the process to rotate the fuel rail 180°*

## Start to remove connector from injector



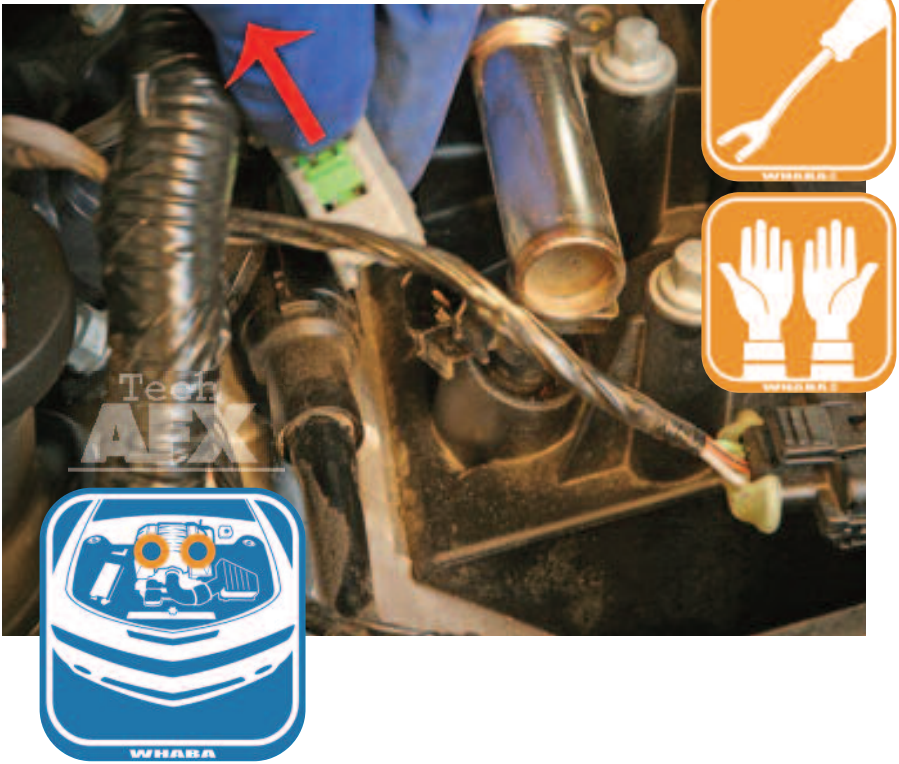
### What to do:

1. Push gray tab in approx. 1 mm 




### Helpful Hint:

*The green tab is a redundant 'lock' clip for the injectors: once it is lifted (performed in the previous Step), the gray primary lock tab can be depressed and the connector removed from the fuel injector*



## What to do:

1. Pull up on wiring connector 
2. Repeat depress/lift on other 7 injectors



Whaba Pat. Pend.

## Helpful Hint:

*On other seven injectors, perform the green clip pull up, gray tab push in and connector pull up to remove wiring connectors—a good tip is to wiggle the connector slightly when pulling up on it to make the removal easier*





## What to do:

1. Pull the wiring looms back off the fuel rails
2. Vacuum around the perimeter (shown in red)



Whaba Pat. Pend.

## Helpful Hint:

*The intake needs to be removed to rotate the fuel rail 180° on the intake, vacuuming top of the engine minimizes the chances of debris falling into an intake port on the engine*





## What to do:

1. Loosen the clamps at each end of tube
2. Wiggle tube off fittings
3. Store for reuse later



Whaba Pat. Pend.

## Helpful Hint:

*The pros pull the tube off the engine throttle body first, then work the tube off the air cleaner box attaching point: save in a clean, dry place in prep for reinstall*



### What to do:

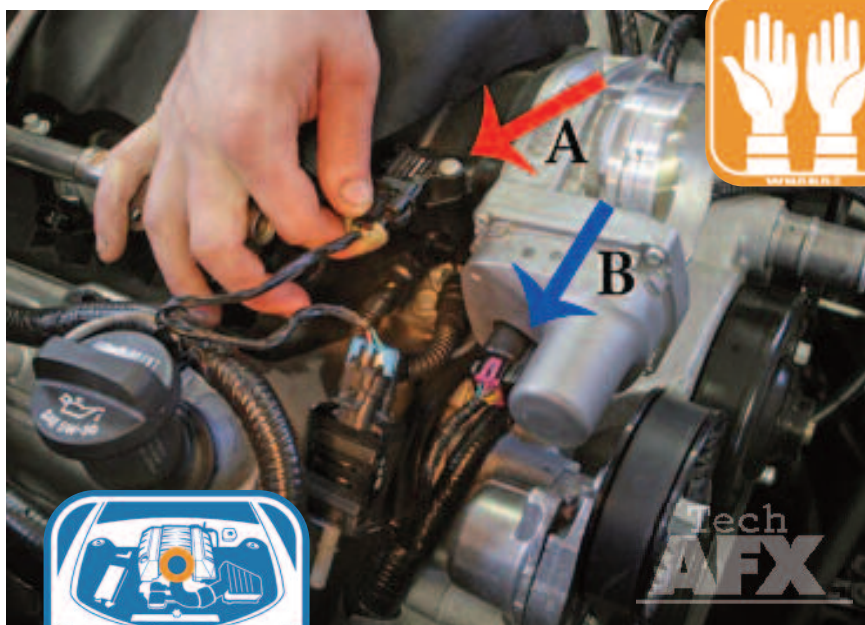
1. Push gray tab on first fitting, remove
2. Repeat on other fitting to remove from intake
3. Store for reinstall later





Whaba Pat. Pend.

### Helpful Hint:

*This hose is the jumper from the EVAP solenoid and the fitting that ports the vapor back into the engine (when the solenoid is open)*



## What to do:

1. Depress tab 4 mm on connector 'A' 
2. Pull connector 'A' off
3. Repeat with connector 'B' 



Whaba Pat. Pend.



## Helpful Hint:

These two connectors are for the **MAP** (manifold air absolute pressure) sensor and the **ETC** (electronic throttle control)

## Release crankcase vent tube



### What to do:

1. Locate tab on side of vent tube
2. Rotate tab approximately 30° 
3. Pull connector off intake fitting 

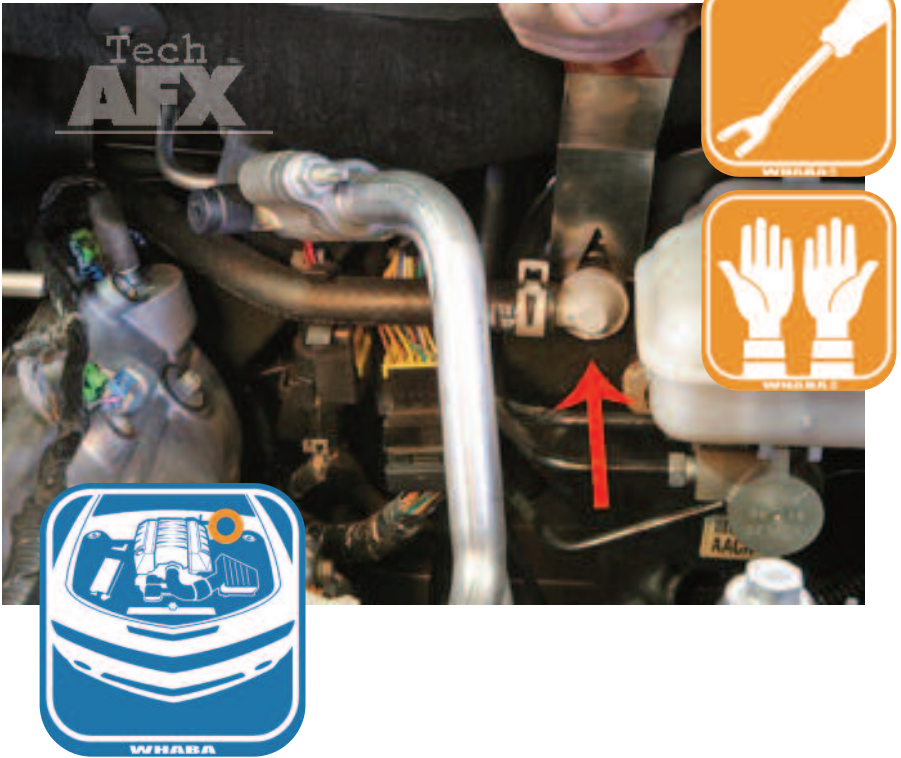


Whaba Pat. Pend.

### Helpful Hint:

*This is the tube that vents the lifter valley into the intake manifold—it is released by pushing the tab over while gently wiggling/pulling hose end off the plastic fitting on the engine*





## What to do:

1. Position tool between booster/connector
2. Pry connector out of booster



## Helpful Hint:



*This hose assembly/plastic connector connects the brake booster to engine vacuum (via a connection at back of intake manifold)—leave the hose on the intake & thread hose around oil pressure sender on block when removing intake (next Step)*



## Remove intake manifold



### What to do:

1. Unthread  10 intake bolts, lift intake
2. Wiggle brake booster hose around sender 
3. Pull intake manifold up off engine



Whaba Pat. Pend.

### Helpful Hint:

*This can be tough: the intake bolts are 'nested', so the intake needs to be raised slightly to get them above their holes & the brake booster hose needs to be guided around oil pressure sender at the back—do this carefully!*



## What to do:

1. Set intake on clean surface
2. Wipe off exterior in prep for work



Whaba Pat. Pend.

## Helpful Hint:

*Now is a good time to get the intake cleaned up, so when you are done it can be installed looking its best*

## Remove rear metal bracket/2 bolts



### What to do:

1. Pull two (2) bolts out of black bracket
2. Remove bracket
3. Save bracket and bolt for reinstall



Whaba Pat. Pend.

### Helpful Hint:

*This bracket and the one on the other side of the intake will need to be removed to rotate the fuel rail—save this for reinstall*



## What to do:

1. Lift bracket and 2 bolts off intake
2. Set bolts aside for reinstall

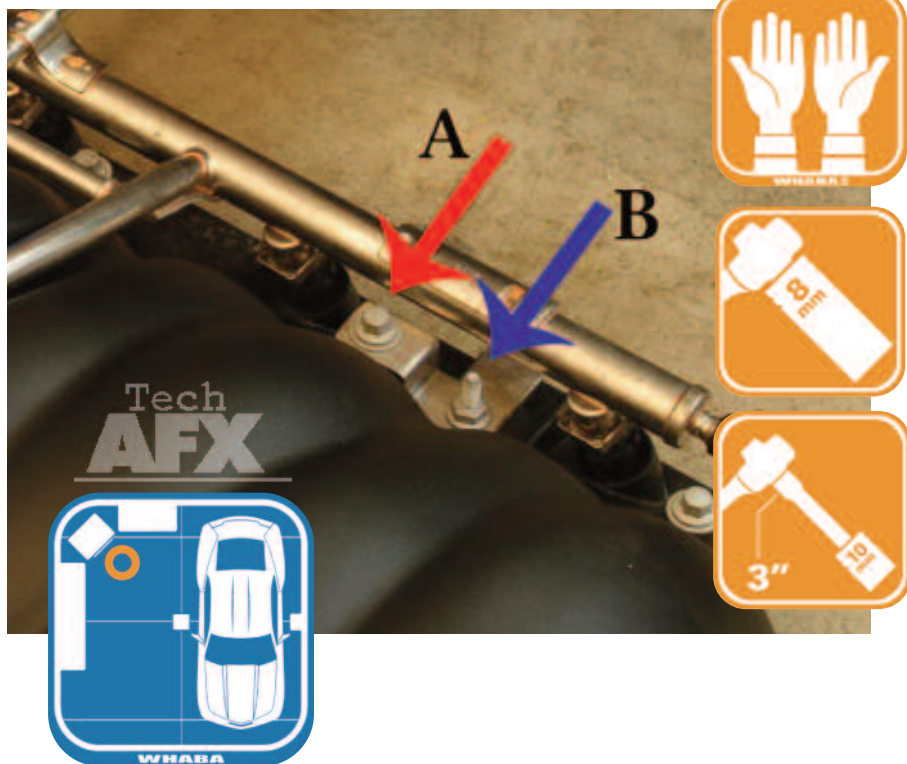


Whaba Pat. Pend.



## Helpful Hint:

*This bracket will not be reinstalled, but the bolts will, so save them*

## Remove bolts holding fuel rail



### What to do:

1. Pull out intake bolt 'A' 
2. Unthread four (4) fuel rail studbolts 'B' 
3. Save intake bolt/studbolts for reuse

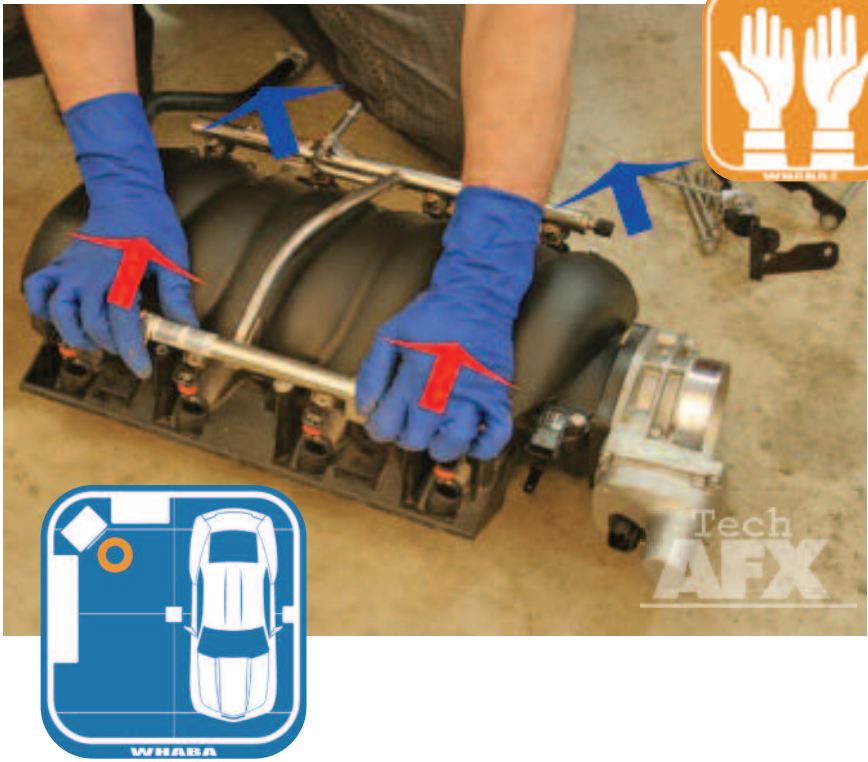


Whaba Pat. Pend.



### Helpful Hint:

*The fuel rail is now ready to be removed from the intake and rotated 180 degrees to enable the installation of the TechAFX Hose Relo kit fuel hose*





## What to do:

1. Pull up on one side of fuel rail 
2. Pull up on other side of fuel rail 



Whaba Pat. Pend.

## Helpful Hint:

The injectors are just pushed into holes in the intake manifold, so once the fasteners holding them in position are removed, they can be 'popped' out of the intake—make sure the o-rings are still seated on each fuel injector



## What to do:

1. Rotate fuel rail 180°
2. Locate all injectors back on holes



Whaba Pat. Pend.

## Helpful Hint:

*This puts the fuel inlet close to the fuel feed line on the passenger side of the vehicle and allows the TechAFX fuel line to be used—and eliminates the ugly factory fuel line that lays on top of the engine!*



## What to do:

1. Moisten all 8 injector o-rings with water
2. Locate fuel rail as shown, push down
3. Stop when injectors 'click' into holes

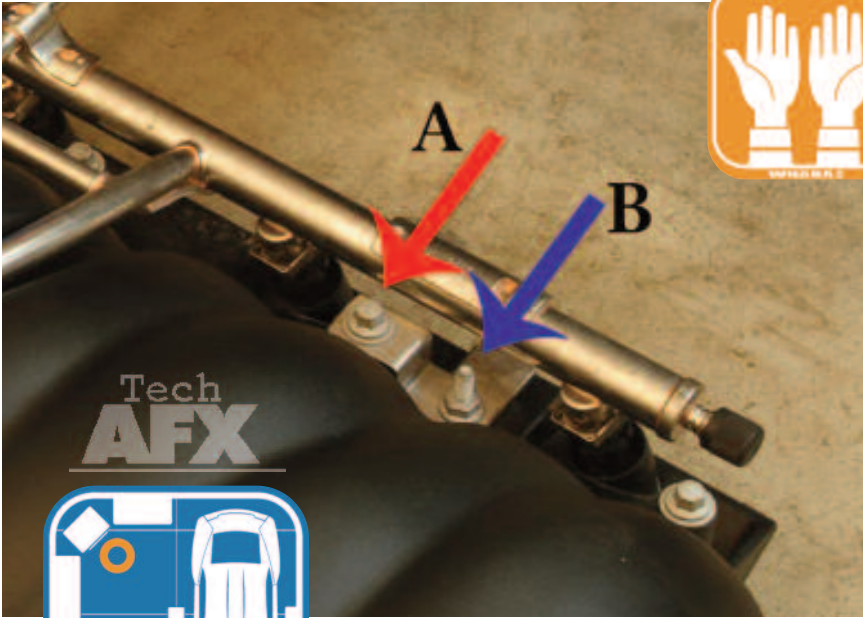


Whaba Pat. Pend.

## Helpful Hint:

*Wipe a light coat of water on each fuel injector o-ring so they slide in easy & check that the fuel rail mounting brackets are seated to intake manifold bosses (where the studbolts are threaded back in) when finished w/ this step*

# Hand start fuel rail holddown studbolts



Parts Needed: [8 mm hex] fuel rail holddown bolts

## What to do:

1. Drop holddown bracket/intake bolt in place ✓
2. Install 4 fuel rail holddown studbolts ✓
3. Hand start the studbolts



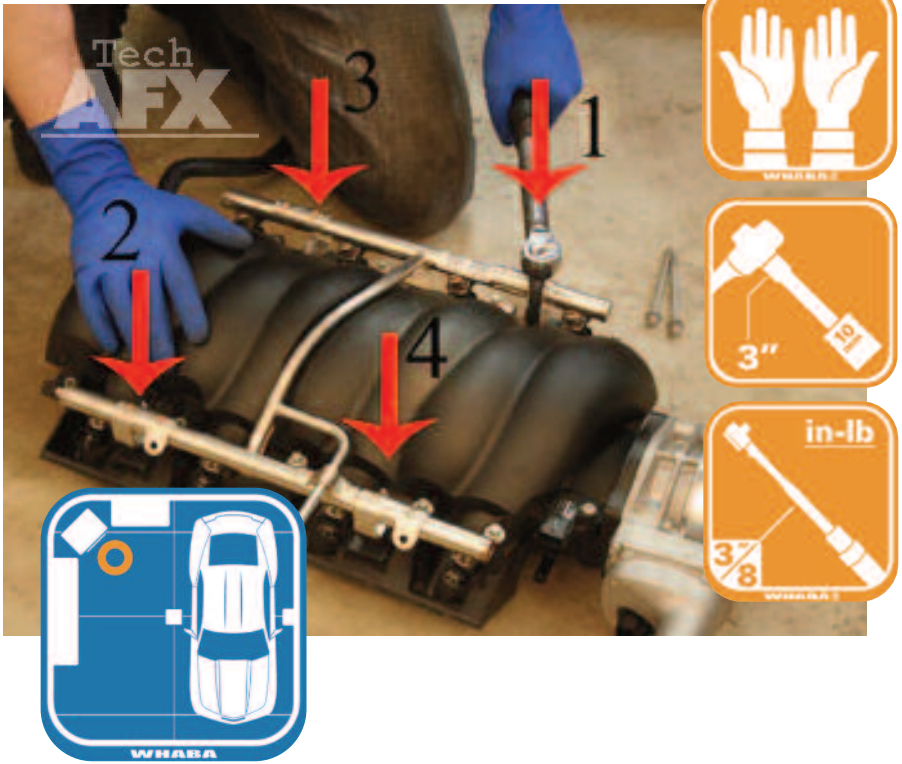
Whaba Pat. Pend.

## Helpful Hint:

*These studbolts go into threaded holes in the intake manifold, so it is very important they are hand started to minimize the chances of crossthreading them in the holes*

# Torque down fuel rail studbolts

1-62



## What to do:

1. Hand tighten bolts in radial pattern
2. Torque all four bolts to 89 in-lbs



## Helpful Hint:

*You will need an in-lb torque wrench to apply this light torque amount to the studbolts*

Whaba Pat. Pend.





Parts Needed: Driver side fuel rail bracket, two 8 mm intake bolts

## What to do:

1. Position bracket as shown
2. Install two intake manifold bolts
3. Make sure all other intake bolts installed



Whaba Pat. Pend.

## Helpful Hint:

*The next step will be installing the intake back on the engine, so inspect the intake in preparation for reinstall: intake port gaskets seated, gasket surfaces clean and all 10 intake bolts nested in holes*



## What to do:

1. Vacuum intake port/valley cover area
2. Pull wires/hoses/etc out of the way



Whaba Pat. Pend.

## Helpful Hint:

*The intake port mounting surfaces should be clean and the area free of anything that would get in the way—as shown*



### What to do:

1. Slide intake back on top of engine
2. Maneuver brake booster hose around sender
3. Get intake to where it seats on engine



### Helpful Hint:

*You'll know when you have the intake in place as it will drop into position—before that, it will sit proud of the engine mounting surface*



Whaba Pat. Pend.



## What to do:

1. Pull booster hose behind a/c hoses
2. Position gray connector at booster
3. Push connector into booster hole



Whaba Pat. Pend.


## Helpful Hint:

*You might want to wipe some water on the connector o-ring to allow it to easily seat into the booster hole*





### What to do:

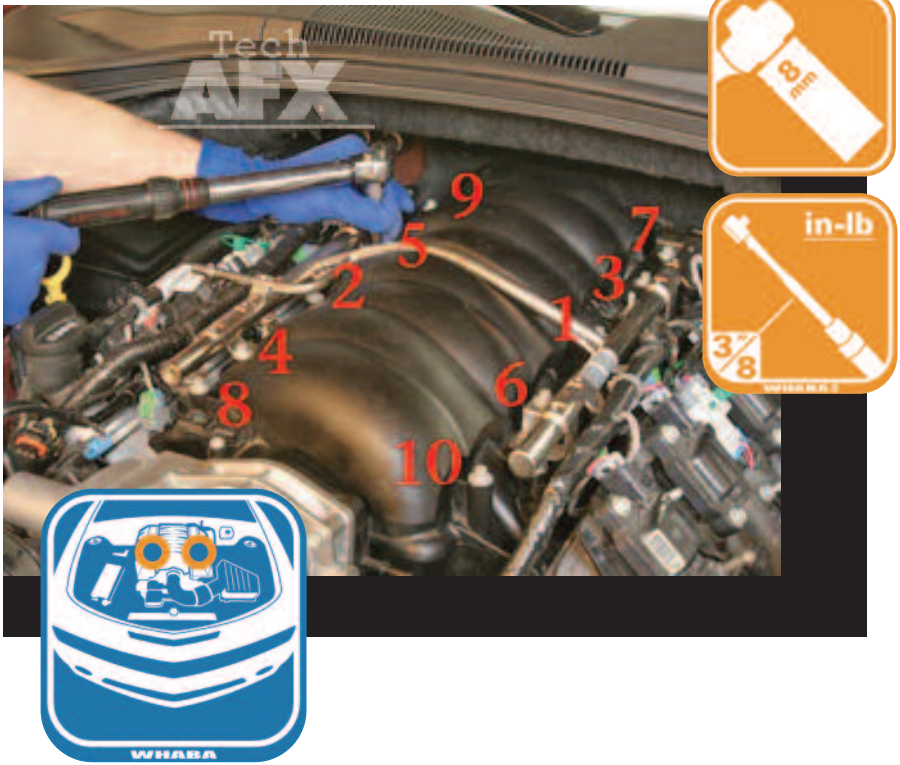
1. Rotate bolts to hand start 
2. Hand tighten intake bolts



Whaba Pat. Pend.

### Helpful Hint:

*When tightening the bolts on an intake manifold, it is a good idea to start at the center fasteners, then tighten the bolts located in a radial pattern from center towards the outer ends of the intake (see next step for sequence)*



## What to do:

1. Hand tighten bolts in sequence
2. Torque to 104 in-lbs in sequence






Whaba Pat. Pend.

## Helpful Hint:

*Make sure to torque the bolts in the sequence shown in the photo—and make sure to make a second pass over all the fasteners to check your work!*



### What to do:

1. Push on EVAP recirculation tube 'A' 
2. Push on crank case vent tube 'B' 
3. Push on connectors 'C' 

### Helpful Hint:

*These are the EVAP and crank case vent hoses, MAP sensor connector (on top) and the ETC (electronic throttle control) wiring connector (on left)*





## What to do:

1. Push wiring connectors into injectors
2. Push down on each green lock clip



Whaba Pat. Pend.

## Helpful Hint:

*The correct connector for each injector should be hanging just next to the appropriate injector (they are evenly spaced on the wiring)*





## What to do:

1. Push each of the 4 clips into holes



Whaba Pat. Pend.

*As you can see in this photo, the TechAFX Hose Relo Kit cleans up the appearance of the LS V8 in the 2010 and later Camaro a ton!*

# Reinstall air cleaner inlet tube

1-72



## What to do:

1. Push tube onto air cleaner box
2. Push other end of tube onto intake
3. Tighten hose clamps to 104 in-lbs



Whaba Pat. Pend.

## Helpful Hint:

*The intake system is now fully reinstalled with the fuel rail rotated 180° from the factory positioning: now you can install the TechAFX Hose Relo kit!*

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**TECHAFX**

# **HOSE RELO KIT**

**Photoinstructions**



**Goal of  
Section:  
TechAFX  
Hose  
Relo  
Hoses  
Installed**

**Helpful Hint:**

*While doing this install, clean the engine bay  
so it looks great when install is finished*



# Check Out **LS7Camaro.com**



**Learn  
How To  
Upgrade  
Your 2010  
& Later**

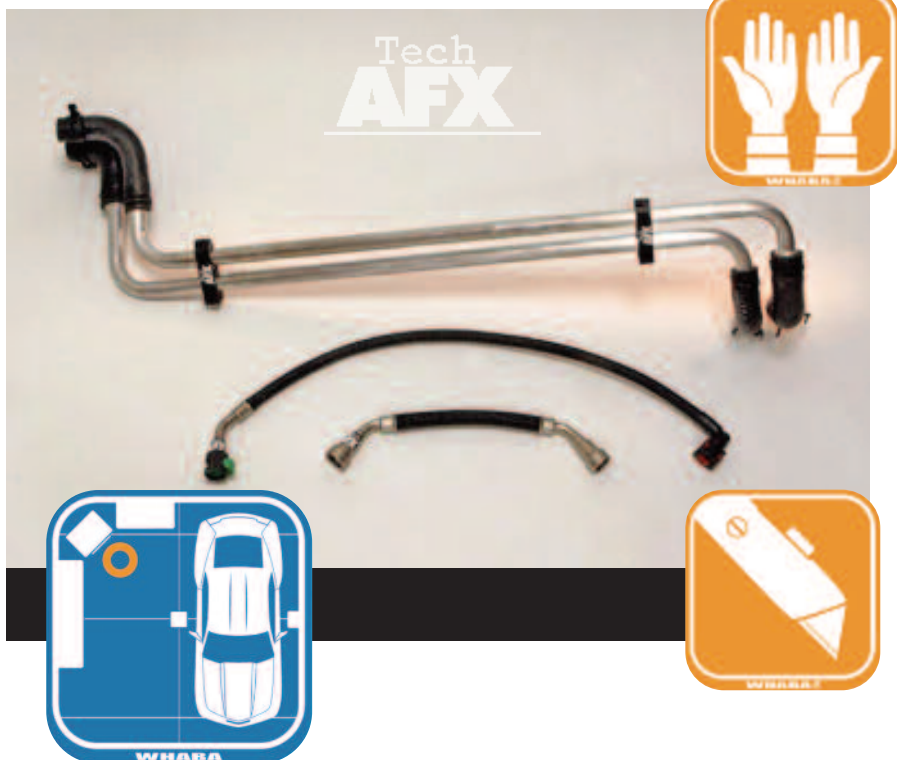
**Camaro to LS7 Power!**

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# Organize TechAFX Hose Relo Kit

2-1



## What to do:

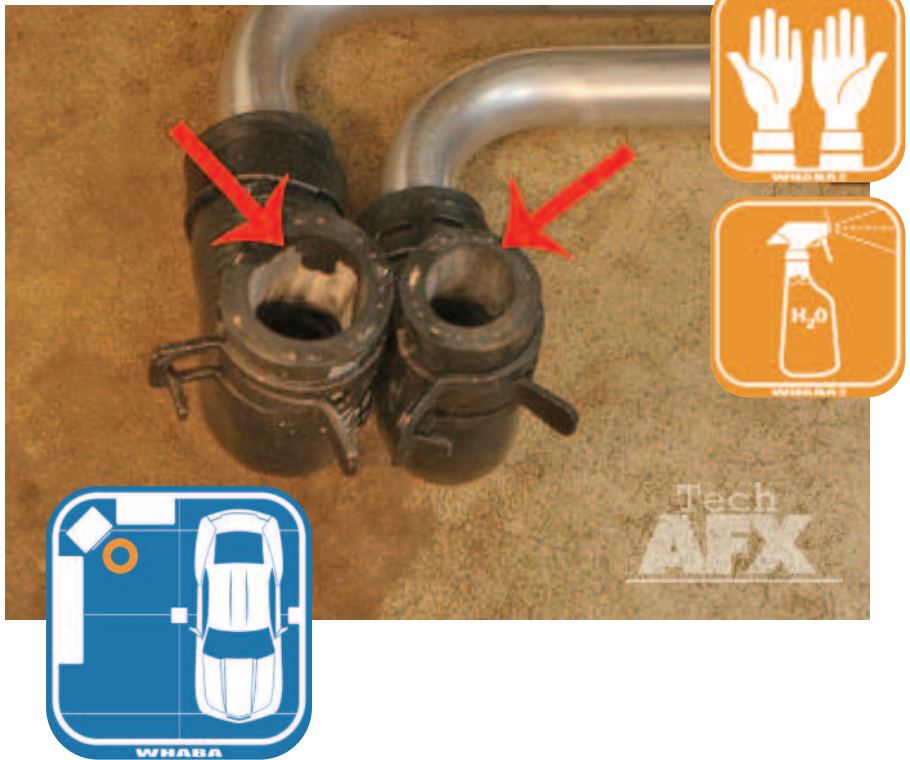
1. Remove from packaging
2. Lay out TechAFX hoses

## Helpful Hint:



Whaba Pat. Pend.

*You should have three hoses: the Heater Hose Assembly (top), EVAP line (middle) and Fuel Line (bottom of image). Notice all have factory-style fittings and are built to factory specifications*



### What to do:

1. Spray light water mist inside hoses



Whaba Pat. Pend.

### Helpful Hint:

*This will provide a temporary lubricant between the hose rubber and the metal fitting; making it easier to install the TechAFX Heater Hose Assembly*

# Thread Hose Assembly under ground wire

2-3



## What to do:

1. Hold Hose Assembly vertically (as shown)
2. Wiggle Hose assembly under ground wire



Whaba Pat. Pend.

## Helpful Hint:

*The TechAFX Heater Hose Assembly is routed under the engine ground wire, which is why this step is required to install the Hose Assembly*



### What to do:

1. Rotate Assembly into car position (shown)
2. Position hose ends near fittings



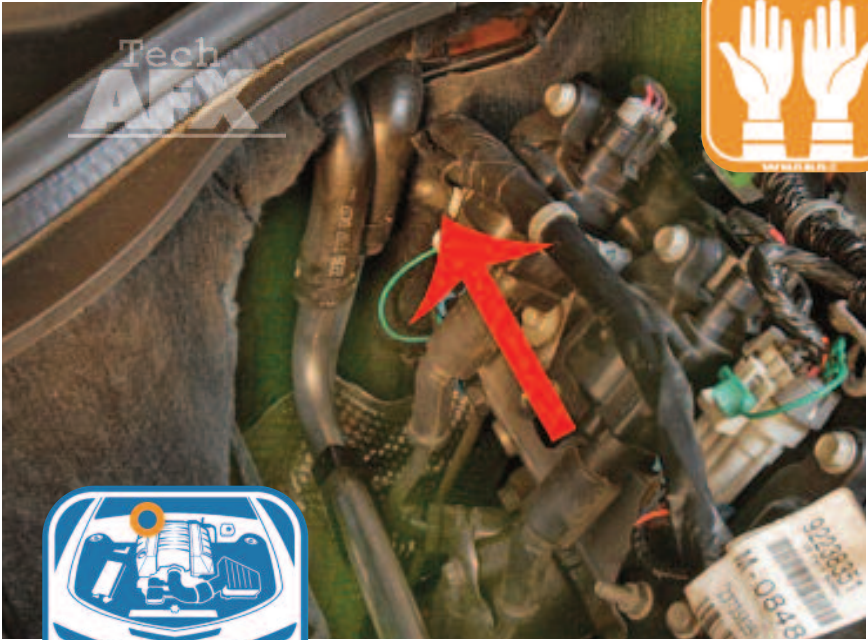
Whaba Pat. Pend.

### Helpful Hint:

*You now have the TechAFX Heater Hose Assembly in its final position, the ends need to be installed on the water pump and heater core fittings to complete its installation*

# Install rubber hose end on studbolt

2-5



Parts Needed: Hose end, provided by TechAFX

## What to do:

1. Push hose end onto stud 



Whaba Pat. Pend.


## Helpful Hint:

*This studbolt is one of many that holds the coil bracket on the passenger side valvecover—adding this hose end minimizes the chances of the studbolt coming in contact with the heater hose assy.*





### What to do:

1. Compress clamp tangs, slide clamp back
2. Push hose on fitting 
3. Compress tangs, slide clamp on, release



Whaba Pat. Pend.

### Helpful Hint:

*The clamp is slid back about 1.5 inches on the hose to make it easier to slide the hose onto the fitting—then reinstalled as shown*

# Install small hose end on fitting

2-7



## What to do:

1. Compress clamp tangs, slide clamp back
2. Push hose on fitting 
3. Compress tangs, slide clamp on, release



Whaba Pat. Pend.

## Helpful Hint:

*The clamp is slid back about 1.5 inches on the hose to make it easier to slide the hose onto the fitting—you have now installed the TechAFX hose ends for the heater core coolant fittings*



## What to do:

1. Compress clamp tangs, slide clamps back
2. Push hoses on fittings
3. Compress tangs, slide clamps on, release



Whaba Pat. Pend.

## Helpful Hint:

*These hoses should slide onto the fittings easily once the clamps are slid back off the ends—once you have these on, the TechAFX Heater Hose Assembly is final installed!*

# Get Rid Of Those Ugly Hoses!

**Clean up the look of your LS V8 engine with a TechAFX Hose Relo Kit**

## BEFORE



The TechAFX Hose Relo Kit improves the look of the LS V8 by moving the Heater, Fuel and EVAP hoses off the top of the engine

*TechAFX  
Hose Relo Kit  
pn 110110*

## The Product Development Team At TechAFX

is constantly developing new products to offer our customers. Our easy-to-install Hose Relo Kit is a perfect example of our commitment to provide the high quality systems you need today!

## AFTER



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### What to do:

1. Unclip ends of TechAFX EVAP line
2. Hold TechAFX EVAP line as shown



### Helpful Hint:

*The TechAFX EVAP line is equipped with OE-style side-clip fittings that are easy to install, look purposeful and provide a quality connection*





## What to do:

1. Push TechAFX connector onto fitting
2. Push TechAFX connector clip in to lock



Whaba Pat. Pend.

## Helpful Hint:

*The TechAFX EVAP line uses fittings with finger engaged- and disengaged-locks on them—this makes it easier to install and remove them if needed*



### What to do:

1. Push connector onto solenoid
2. Push lock clip in place



Whaba Pat. Pend.

### Helpful Hint:


*The TechAFX EVAP line is now fully installed: you are 2/3s of the way to fully installing the TechAFX Hose Relo kit!*

# Install one end of TechAFX Fuel line

2-12



## What to do:

1. Locate male fuel end on fuel rail
2. Push TechAFX Fuel Line onto fitting 



Whaba Pat. Pend.

## Helpful Hint:

After install, check that the locking tangs on the QD fitting are fully seated by giving the QD fitting a slight tug off the male tube mating point—these QD fittings are either on or off, so if it stays in place, it is on



2-13

## Start install of secondary clip



### What to do:

1. Slide long tangs into metal QD connector



Whaba Pat. Pend.

### Helpful Hint:

*This is one of the many advantages of the TechAFX products: they are equal or better than what you get with the vehicle from the original manufacturer: so you can install the factory secondary clip on the fuel line!*

## Pull secondary clip into position

2-14



### What to do:

1. Pull secondary clip onto connector
2. Push clip onto tubing to lock in position



Whaba Pat. Pend.

### Helpful Hint:

*Make sure the tangs that go into the connector are not pushing on the internal QD locking tangs: if they are, the clip will not pivot down to 'seat' properly on the tubing—Fix: just wiggle it to position around the lock tangs*



## What to do:

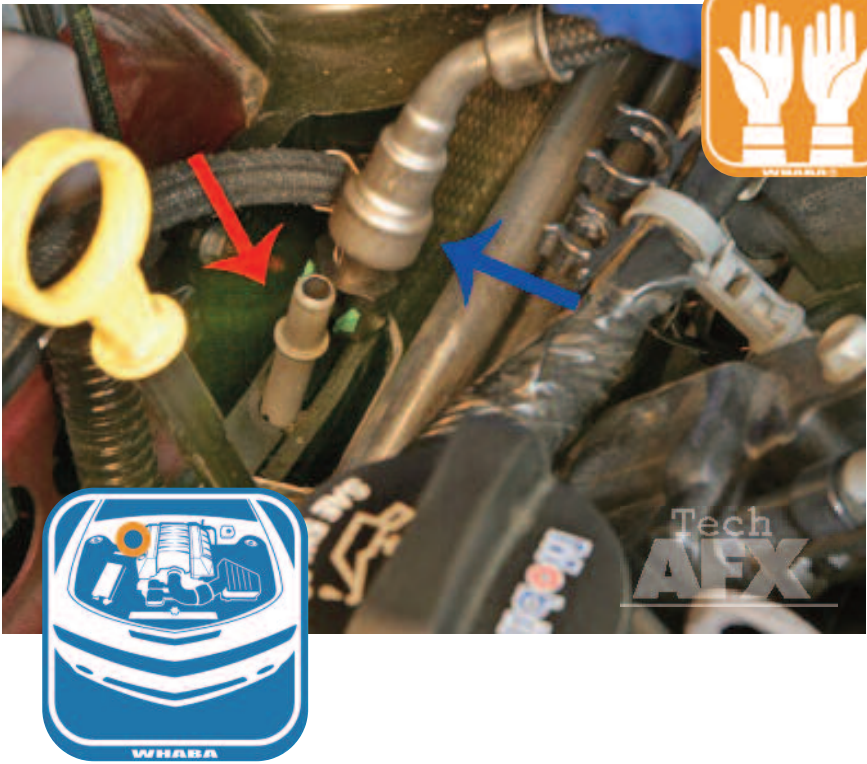
### 1. Visually inspect secondary clip install





Whaba Pat. Pend.

### Helpful Hint:

*This provides a secondary lock for the factory QD fuel fittings*



## What to do:

1. Locate fuel hardline on body structure 
2. Push TechAFX Fuel line onto fitting 
3. Install secondary clip on fitting



Whaba Pat. Pend.

## Helpful Hint:

*FYI: The stainless steel fuel line fittings on the TechAFX Fuel line are the same design the factory uses on their fuel lines & are affixed to black, teflon-lined, braided hose with a 360° crimped collar—just like the factory*





## What to do:

1. Enjoy the clean, impressive TechAFX product!



Whaba Pat. Pend.

## Helpful Hint:

*You have now installed all the hard parts for the TechAFX Hose Relo kit—the remaining work is to top off and ‘bleed’ the engine coolant system of any trapped air: then its time to enjoy your newly cleaned up engine bay!*

TECHAFX

# BLEEDING COOLING SYSTEM & FINAL PREP

Photoinstructions



**Goal of  
Section:  
TechAFX  
Hoses  
Installed  
& Vehicle  
Ready to  
Drive**

## Helpful Hint:

*Use soapy water to clean up any coolant that falls onto the floor*

# Buy the No Spill Funnel used in this section from **TechAFX.com**

This funnel does a great job getting the air  
out of your cooling system!



## **The Product Development**

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*TechAFX No Spill Funnel  
pn 310112*

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# Prepare to install Coil Covers

3-1



Parts Needed: Lingenfelter or GM Coil Covers

## What to do:

### 1. Pull Covers from packaging

#### Helpful Hint:



Whaba Pat. Pend.

*The TechAFX Hose Relo kit allows the install of good looking coil covers, which is what the Camaro should have come with in the first place: use either Corvette covers or these cool Lingenfelter Performance engine covers, both install the same*





Parts Needed: 4 'U' Grommets (GM pn 12594875),  
4 'Plug' grommets (GM pn 12586893)

### What to do:

1. Push 'U' grommets in until 'click'
2. Push plug grommets in holes

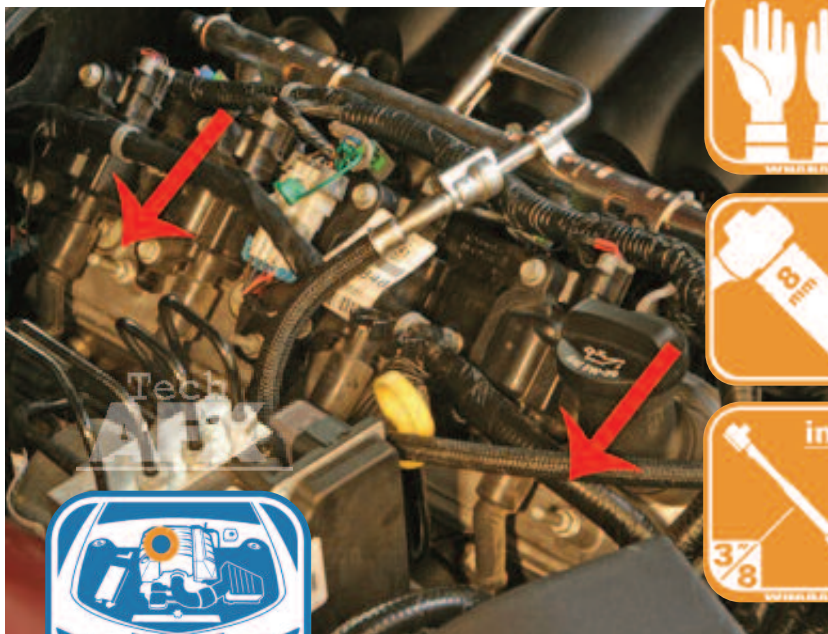


### Helpful Hint:

*These can be ordered along with the covers from Lingenfelter, or you can buy them from your local GM dealer via pns 12594875 (quantity 4) and 12586893 (quantity 4): there are two 'U' grommets and two 'plug' grommets per coil cover*

# Install 2 studs on passenger valvecover

3-3



Parts Needed: Engine cover studs (GM pn 11589406)

## What to do:

1. Hand start studs into valvecover
2. Hand tighten studs
3. Torque studs to 104 in-lbs



Whaba Pat. Pend.

## Helpful Hint:

Buy studs @ any GM dealer via pn 11589406.  
If you want to run LS3 Corvette coil covers, buy them  
with pn 20811204 & pn 20811205, then trim via the  
Data Drawings template (pn v1DDLS7WSLS7covertrim)  
available @ [www.datadrawings.com](http://www.datadrawings.com)



## What to do:

### 1. Remove existing valvecover stud



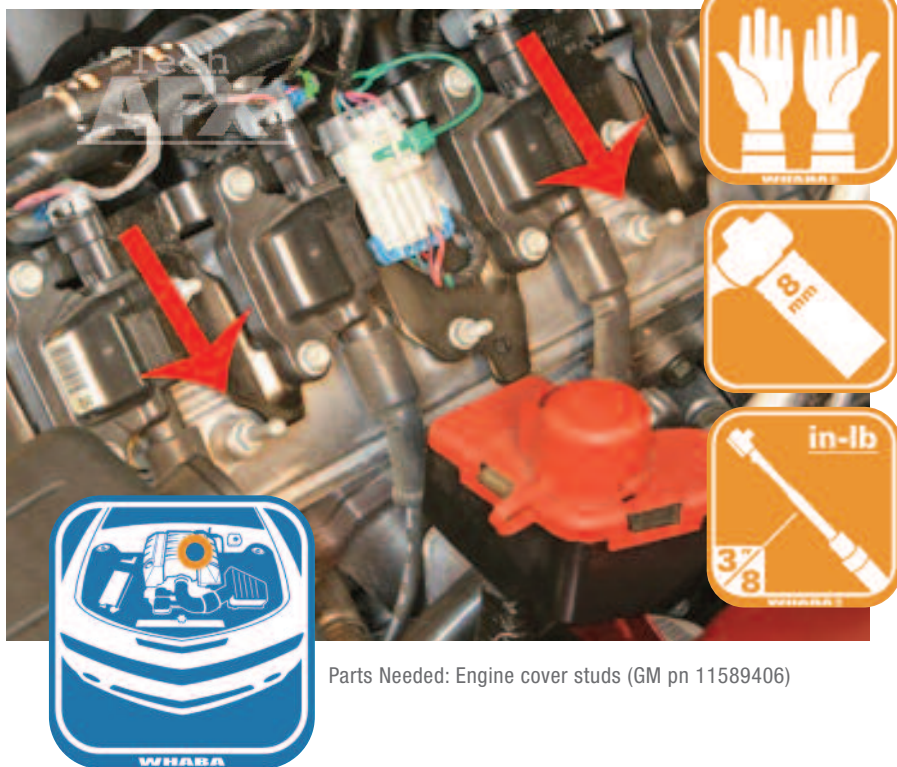
Whaba Pat. Pend.

### Helpful Hint:

*The Camaro comes with this one oversized stud on the front edge of the driver side valvecover—but it is too big for the Corvette stud grommets and needs to be removed and replaced*

# Install 2 studs on driver valvecover

3-5



Parts Needed: Engine cover studs (GM pn 11589406)

## What to do:

1. Hand start studs into valvecover
2. Hand tighten studs
3. Torque studs to 104 in-lbs



Whaba Pat. Pend.

## Helpful Hint:

*These engine cover studs are used on the Corvette—  
they are available from any GM dealer via pn 11589406*





### What to do:

1. Line up cover over engine studs
2. Push down on covers



Whaba Pat. Pend.

### Helpful Hint:

*You might need to re-arrange the wiring and hose routing a little if the cover grommets don't seat fully into the studs (the plug grommets) and the fuel rail (the 'U' grommets grab the fuel rail)—it shouldn't take much to get this installed*

## Reconnect battery ground cable)

3-7



### What to do:

1. Remove rag from connector
2. Install wire connector on battery post
3. Tighten nut to 89 in-lbs



Whaba Pat. Pend.

### Helpful Hint:

*The vehicle will have power again after the battery is reconnected in preparation for firing the engine up*



### What to do:

1. Remove red cap, install 'no spill' funnel
2. Pour coolant into radiator
3. Cover top of funnel with rag



Whaba Pat. Pend.

### Helpful Hint:

*Using a 'no spill' funnel will minimize the chances of overfilling the radiator: just make sure not to pour coolant too quickly into it (you want to keep it less than half filled) as the system bleeds air out*



## What to do:

1. Have help monitor engine bay
2. Start engine with key
3. Set heater on full HOT with fan



Whaba Pat. Pend.

## Helpful Hint:

*The fuel pump might need to be cycled a few times before the engine fires: do this by turning the key to 'ON' without starting the engine a few times, then crank the engine by turning the key to 'START' until the engine fires*





### What to do:

1. Keep coolant 2 inches deep in funnel
2. Keep rag on top of funnel



Whaba Pat. Pend.

### Helpful Hint:

*Running the engine is one way to bleed the radiator, you can also use a coolant system bleeder (if you have access to one) to do this same process: run engine for less than 9 minutes, topping off coolant as needed*



## What to do:

1. Turn off engine
2. Place stopper in funnel, remove
3. Pour excess coolant into overflow



Whaba Pat. Pend.

## Helpful Hint:

*The No Spill coolant funnel works because it creates a 'high point' for all the air trapped in the coolant and heater circuits to escape—it works really well, too*



### What to do:

1. Place radiator cap on fitting
2. Rotate until stops 



Whaba Pat. Pend.

### Helpful Hint:

*Remove all tools, rags and other materials you have used to do this swap in preparation for taking your vehicle out for a test drive!*



## What to do:

1. Enjoy the improved look of your V8!



Whaba Pat. Pend.

## Helpful Hint:

*Installing the TechAFX Hose Relo kit on the 2010 Camaro is accomplished by most with simple hand tools, in a garage setting, in under 2 ½ hours: and looks great when completed*



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# Process Milestones And Icon Details



**Goal of  
Section:**  
Learn How  
To Keep  
Moving,  
What Tools  
To Use And  
Where To  
Work

*Helpful Hint:*

*Read about these common  
roadblocks before starting*



# Process Milestones Key: TechAFX Hose Relo Kit Install

These are the Milestones for installing the TechAFX Hose Relocation kit in a 2010 and later Chevy Camaro: removing stock components/hoses, installing TechAFX hoses, filling/bleeding cooling system & adding coil beauty covers

## Process Milestones

## Step Locations

### TAB 1

Open hood, confirm engine in Camaro is LS V8	1-1 to 1-4
Disconnect vehicle 12 V battery	1-5 to 1-9
Remove 'snowsled' engine cover	1-10 to 1-12
Drain engine coolant	1-13 to 1-17
Disconnect heater hoses at water pump	1-18 to 1-21
Disconnect heater hoses at heater core	1-22 to 1-27
Remove factory fuel hose	
Remove 'snowsled' bracket from intake	1-28
Remove hose from brackets	1-29, 1-35 to 1-36
Bleed fuel rail	1-30
Separate fuel quick disconnect (QD) at fuel rail	1-31 to 1-34
Separate fuel QD at body mount	1-37 to 1-38
Remove factory fuel hose assembly	1-39
Remove factory EVAP hose	
Separate hose QD at sensor	1-40
Separate hose QD at body mount & hose from car	1-41 to 1-42
Remove fuel injector wiring	
Move wiring	1-43
Separate connectors	1-44 to 1-46

## Process Milestones

## Step Locations

### TAB 1 continued

Vacuum around perimeter of intake	1-47
Remove air cleaner tube	1-48
Remove hoses and wiring	1-49 to 1-52
Remove intake manifold from vehicle	1-53
Rotate fuel rail 180 [degrees]	1-54 to 1-63
Reinstall intake manifold on engine	1-64 to 1-68
Reinstall wiring and hoses	1-69 to 1-72

### TAB 2

Prep TechAFX Hose Relo kit for install	2-1
Install TechAFX Heater Hose Assembly	2-2 to 2-8
Install TechAFX EVAP Hose Assembly	2-9 to 2-11
Install TechAFX Fuel Hose Assembly	2-12 to 2-17

### TAB 3

Prep coil beauty covers for install	3-1
Install mounting studs for coil covers	3-2 to 3-5
Install coil beauty covers	3-6
Reconnect vehicle 12 V battery	3-7
Fill & Bleed coolant system	3-8 to 3-12
Enjoy beautiful TechAFX-equipped LS V8!	3-13



# Tool Icon Key



Hands



Eyes



Rags



Box Cutter



10mm Deepwell  
Socket on 3/8 inch  
Ratchet Wrench



8mm Deepwell  
Socket on 3/8 inch  
Ratchet Wrench



Torque Wrench  
(in-lb), 3/8 inch



Hose Pry Tool, 90°



Hose Pry Tool, 180°



Drain Pan

# Tool Icon Key Continued



Pliers, Regular



Pliers,  
Needle Nose



Interior Clip  
Pry Tool



Water Spritz  
Bottle



8mm Deepwell  
Socket on 3/8 inch  
Ratchet Wrench



Two People  
Needed to  
Perform Task



No-Spill  
Funnel



GM QD Release Tool,  
3/8 inch Tube



GM QD Release  
Tool, 5/16 inch  
Tube

# Work Icons Key



Shop Area



Engine, top



Trunk



Engine, top,  
Passenger side, front



Engine, top, center,  
front



Under vehicle,  
radiator, driver side



Radiator, top, center



Under vehicle,  
engine bay,  
passenger side



Engine, front,  
passenger side



Firewall,  
passenger side



Engine, top, rear,  
center

## Work Icons Key Continued



Engine, top, passenger  
side, back



Engine, top, driver  
side, front



Engine, top, driver  
side, center



Engine, top, pass side,  
center



Next to Engine,  
pass side, center



Air cleaner tube,  
center



Brake Master  
Cylinder, driver side,  
firewall



Drivers seat and  
Engine bay



Engine bay



Driver's door handle



Engine, top, driver  
and passenger  
sides

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This Dr Whaba Photoinstruction kit describes how to install the TechAFX Hose Relocation kit for V8-powered 2010 and later Chevrolet Camaros. This information is for experienced and knowledgeable technicians only. The procedures described require specialized tools and skills. If you do not have the appropriate training and equipment, consult a professionally trained mechanic regarding this work. Dr Whaba Photoinstructions are intended for entertainment purposes. Always consult manufacturers instructions for safety recommendations, torque specifications and other critical information before attempting this process.

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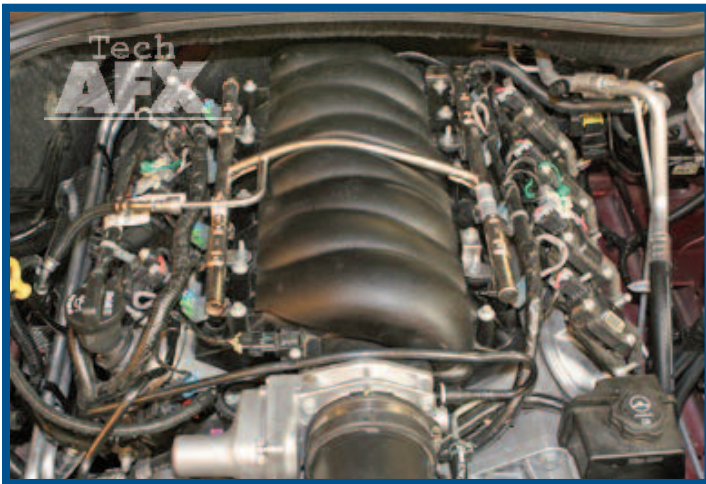




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