



Air Flow Research Intake Manifold Instructions Small Block Chevy Composite Intake

Congratulations on the purchase of your new AFR Titon composite intake manifold! This part was designed to maximize performance as well as provide flexibility by virtue of the airflow passages being separated from the other typical functions of the intake. AFR offers a variety of performance “spiders” that can be used with the universal valley plate.

Valley Plate

#4500 SBC Valley plate

Spider Options

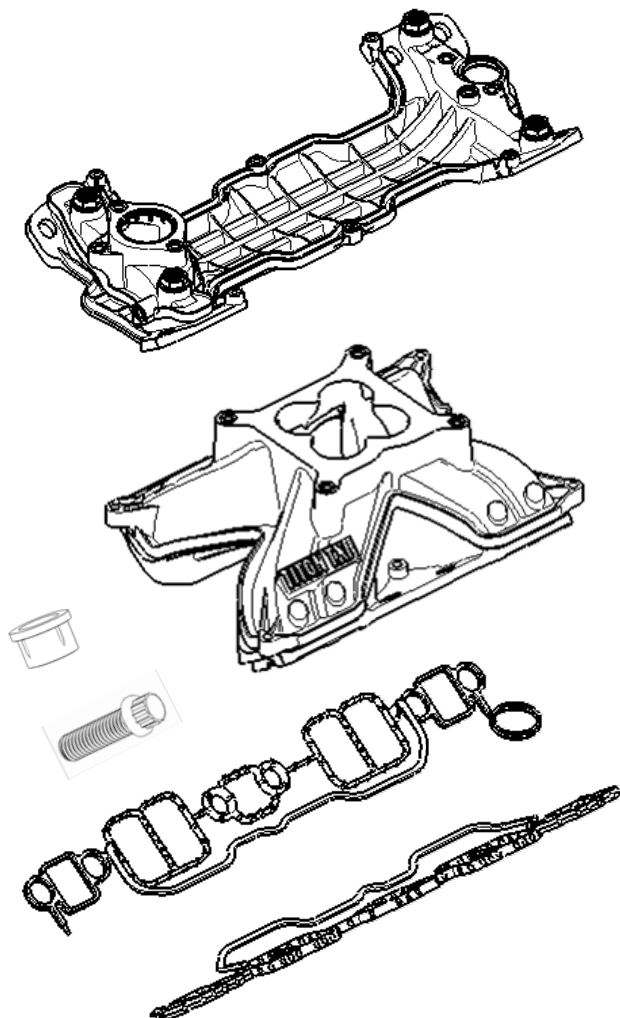
- #4650 SBC Titon Race TXR Spider
- #4651 SBC Titon Street TXS Spider
- #4652 SBC Titon Dominator TXD Spider
- #4653 SBC Titon Dual Plane Race DPR Spider
- #4654 SBC Titon Dual Plane Street DPS Spider

Hardware:

- | | |
|---|------|
| #4600 Compression Limiters | (8) |
| #6299 Intake Manifold Washer | (12) |
| #6300 Intake Manifold Bolts | (12) |
| #4603 Distributor Clamp | (1) |
| 6mm (5 mm hex) bolts & washers | (6) |
| Vacuum nipple | (1) |
| Vacuum nipple fastening screws | (2) |
| Distributor Clamp Plate (Pre-Installed) | (1) |
| #4606 Dow Corning 732 Silicone | (1) |

#4550 SBC Seal Kit

- | | |
|---|-----|
| Distributor seal | (1) |
| Head Port seals | (2) |
| Coolant Port seals | (4) |
| Valley Plate seals | (2) |
| Heat riser/EGR insulator pad (available upon request) | (2) |



The following warnings are intended to ensure your AFR experience is a positive one. Please read the following warnings and the entire assembly instructions carefully before starting to install your new intake manifold on your engine. Failure to follow these steps may negatively affect your warranty.

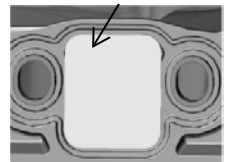
Warning:

Do not over-torque any fittings beyond the specified torque specification. While this intake manifold has been carefully engineered for use on your Small Block Chevy engine and uses a new high-strength polymer, the customer must recognize that this manifold can be damaged by exceeding the specified torque limits, and failing to follow these limits will void your warranty. Torque relaxation of fasteners joining composite materials is normal. However, when the customer uses a medium-strength thread-locker as instructed, this relaxation will have no detrimental affect on performance. Should the customer wish to remove the spider and reinstall it or if the customer wishes to retighten this joint after engine usage, new thread-locker should always be applied to the fasteners.

Warning:

All mounted accessories (Carb, Thermostat housing, etc) that attach to the manifold must make contact with the brass inserts. If these are not pushing against the insert, the insert can be pulled/jacked out from tightening the bolt or stud. Please follow torque specs on the quick installation sheet.

EGR Block-off Shield
(available upon request)



Warning:

AFR has EGR block-off shields available upon request, please call if your application has EGR/heat riser passage. Failure to do so may direct excessive heat towards the spider port seal gasket and will void your warranty (see picture). EGR block-off shields are not legal for sale or use on pollution controlled vehicles.

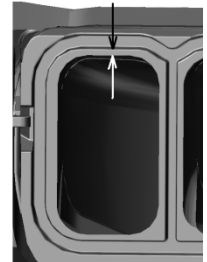
Warning:

Never remove or pull an engine by pulling/lifting from the inserts on the carburetor flange. This will break the spider and/or valley plate.

Warning:

Use extreme caution if you choose to port this part. Porting may irreversibly damage your manifold if great care is not used and doing so may void your warranty. Always leave at least .080" between the port entrance and the gasket groove (see picture).

0.080"



Warning:

Removal of gaskets sealing coolant and air from the cylinder head can cause small tears at the interface of the gasket to the mating Aluminum head after extended usage. With care in removal of gaskets, often gaskets can be reused multiple times, however, if you suspect that after removal a gasket is leaking, order a replacement and do not try to repair the gasket.

Warning:

Before installation check distributor clearance without O-Ring gasket to make sure distributor does not bottom out on the oil pump drive shaft and has enough engagement.

Warning:

When removing baseplate cut along the end wall silicone bead using a razor blade or sharp edge to ensure a clean break from the engine block. Do not pry manifold from block prior to cutting the rear bead of silicone with a razor blade.

Warning:

Do not install any type of electric sending units (water temp related) and ground it to the engine. While the sending will work, electrolysis will erode the 1/2" NTP brass fitting and clip. The eroded brass fitting can break free, potentially releasing hot engine coolant which can cause bodily injury, engine damage or cause you/others to lose control if excessive coolant gets on the track.

I. Intake Manifold Installation Preparation:

At this time, you should have your old intake manifold removed. If your cylinder heads aren't new, you will need to conduct a thorough clean-up of the cylinder head mounting surfaces. If this is not already done, even if this seems self-explanatory, please take a few minutes to read the following.

Port Surface Cleaning:

To prevent debris (old gaskets & RTV) from falling into the ports and combustion chambers when cleaning your head surfaces, lay rags in lifter galley and stuff rags into the ports. After the heads have been cleaned, remove rags from the ports carefully making sure all particles fall onto the rags in lifter galley. Carefully remove rags from the galley. Wipe cylinder head surfaces clean with rags using carburetor or brake parts cleaner to remove any oil or grease. Do not forget rags in ports before assembling intake manifold.

Note: This step is a **must** to ensure proper sealing.

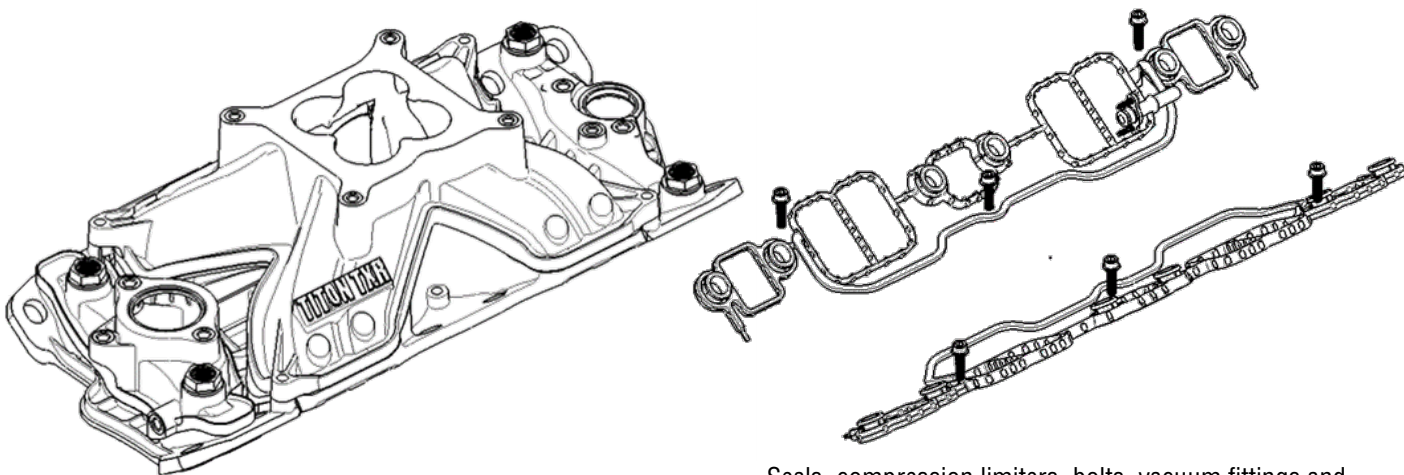
Gasket Specifications:

Must use supplied Dow-Corning 732 Multi-Purpose Sealant and O-Ring style gaskets to fully seal your engine.

Warning: O-ring gaskets protrude beyond the sealing surface so take special care not to slide past sharp edges, such as cylinder head port openings.

II. Intake Manifold Installation:

Your new Titon intake manifold is shipped partially pre-assembled. Follow the rest of the steps to complete installation to your engine.



Seals, compression limiters, bolts, vacuum fittings and other hardware will be shipped in separate bags.

Step 1:

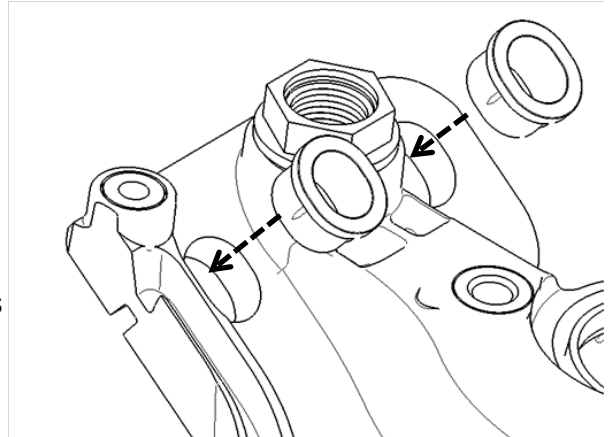
Install compression limiters in valley plate.

Compression limiters protect the composite manifold from the high-torque (25 ft-lbs) used to bolt the manifold onto the cylinder heads.

At this stage, you only need to lightly press fit or start the compression limiter into the 8 oval openings. The limiters should be pushed in deep enough so that they will not fall out during handling prior to final manifold assembly.

To start the limiters, place the bottom of the valley plate on a flat surface and lightly tap the compression limiters until they each seat into their respective holes by at least 0.100". In a later step, you will let the tightening of the 3/8" – 16 bolts to simply & easily push the compression limiters into their final and correct locations. While tapping on the limiters, use care not to damage the valley plate's sealing surface or the surface of your cylinder head, if you elect to do this on-engine.

Once the compression limiters are in place they should stay fixed to the manifold and will not need to be removed for subsequent assembly or disassembly.

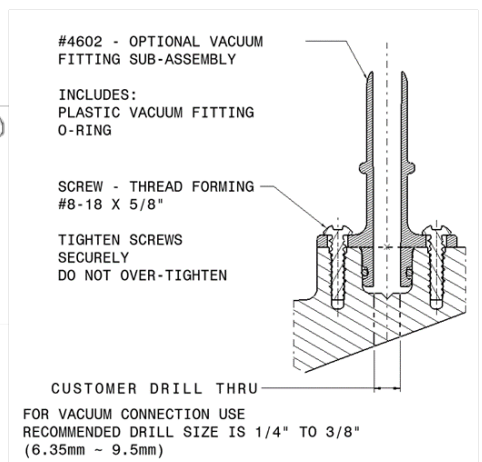
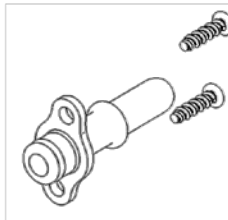


Step 2:

Drill and assemble the provided vacuum fitting (IF REQUIRED – THIS STEP IS OPTIONAL) to the manifold spider prior to installation.

A 3/8" vacuum fitting has been provided with the intake manifold. This can be used with a quick connect or with a simple hose and hose clamp.

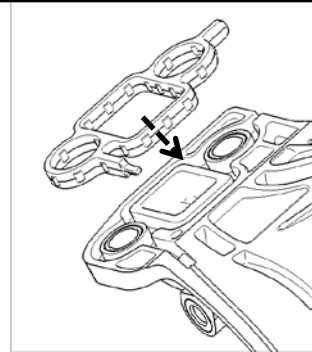
The seal surface is pre-molded in the spider but a through-hole **MUST** be drilled in the spider to permit vacuum to be delivered from this fitting. Soapy water can be used to lubricate the o-ring to aid in installation.



Step 3:

Install (4) coolant port seals in the valley plate.

During re-installs, the coolant O-Ring gasket may not seal fully against the cylinder head, use supplied silicon or call for replacement gaskets.



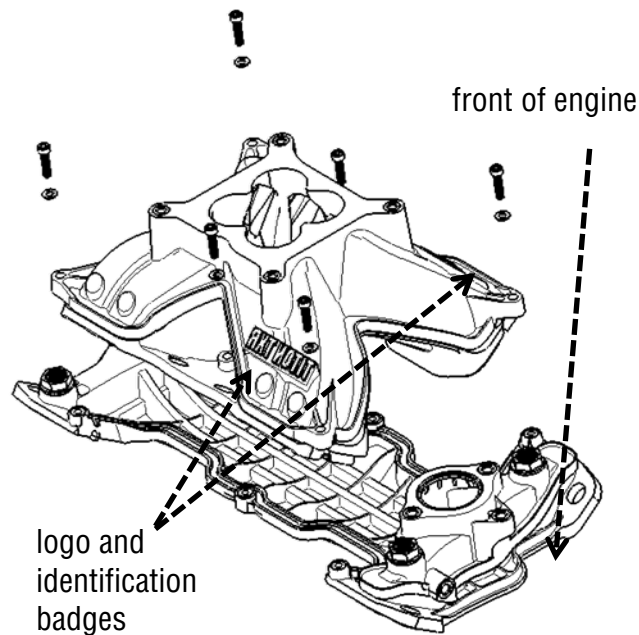
Step 4:

Pre-assemble the spider to the valley plate

Position the logo/identification badges on the spider toward the front of the engine (coolant outlet side of valley plate).

Position the spider to the valley plate and hand start the (6) M6 socket head cap screws (use provided washers).

Note: the valley plate and cylinder head port seals are purposely not assembled at this time.

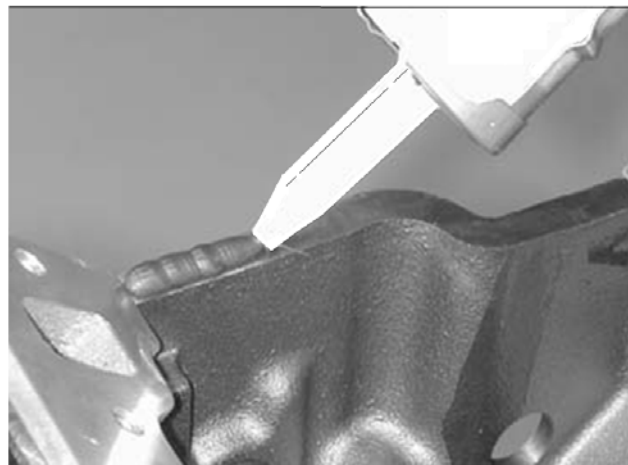


Step 5:

Apply Dow-Corning 732 to engine block End-Wall.

Ensure block surface is clean and dry. For the ends of the block, commonly referred to as the china wall, you **must use supplied Dow-Corning 732** instead of gaskets or silicones (failure to use supplied sealant could result in loss of oil).

Apply a 1/4" thick ribbon of sealant across each end seal surface and in the 4 corners where the heads meet. Requires a **minimum dry time of 24 hours** before firing your engine.

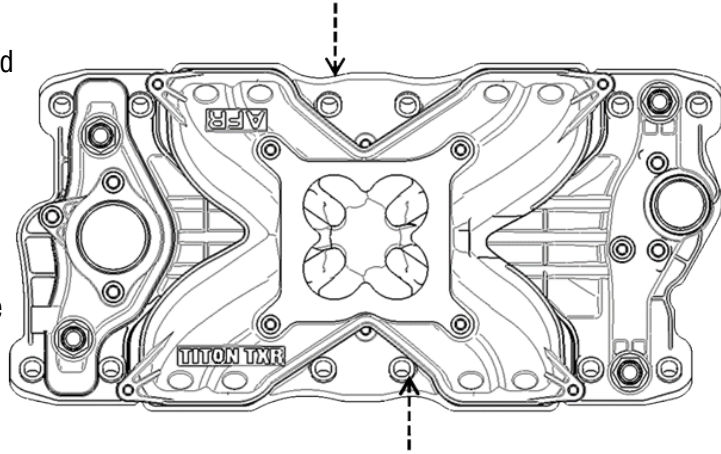


Step 6:

Set-up alignment to engine

This step is to align the valley plate position based upon the best spider/port positioning.

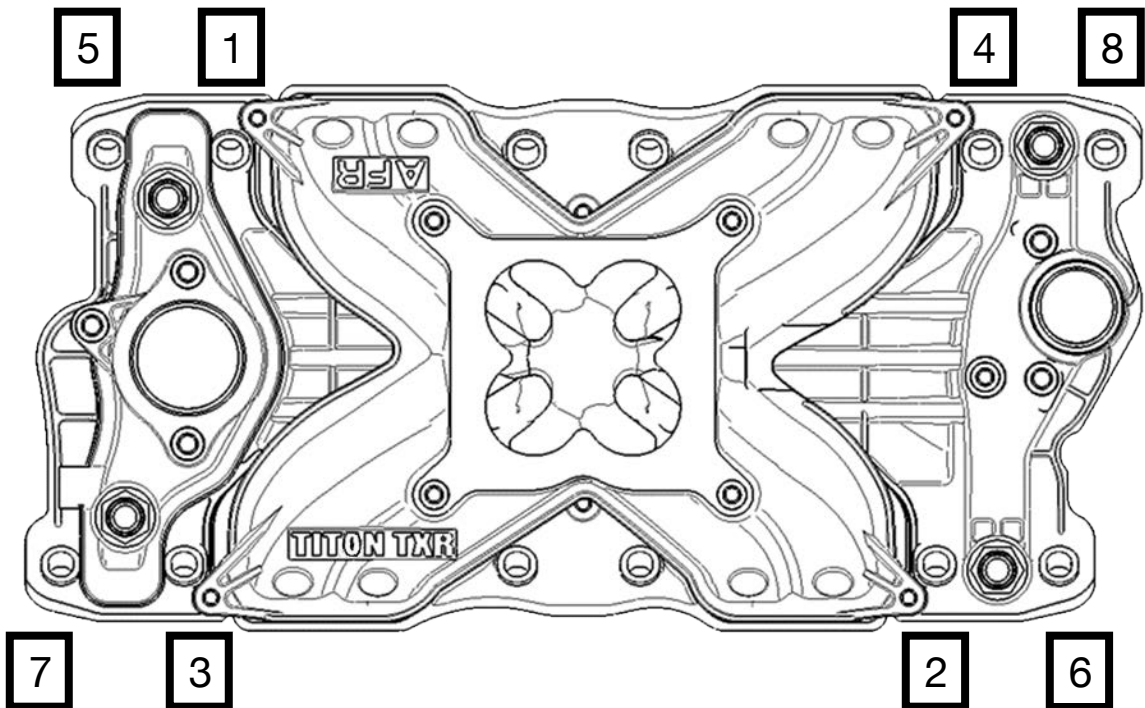
Place the valley plate and spider on the engine at the same time. The valley plate should have the green coolant seals installed, however, do not install the orange valley plate seal and black port gaskets. Temporarily tighten (2) 3/8" bolts at the locations indicated by the arrows. do not torque; just tighten enough to restrict movement.



Step 7:

Tighten Valley Plate

Without loosening the 2 spider bolts which were hand-tightened in step 5, using the 12 point cylinder head bolts provided, tighten the (8) valley plate fasteners per the sequence below, using at least 3 passes to reach a final torque of 25 ft-lbs



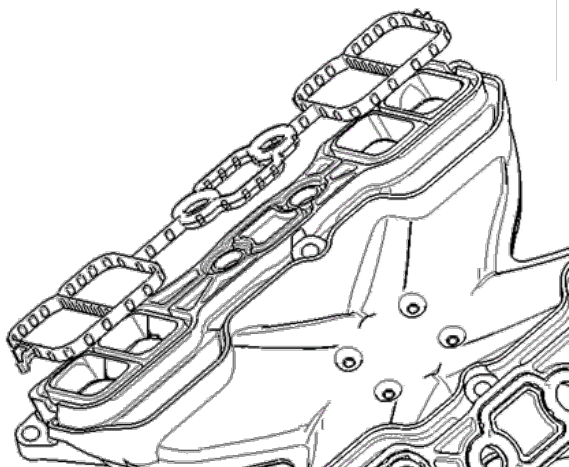
Note: Once the valley plate is properly mounted, the manifold spider can be removed without disturbing the coolant system or ignition timing.

Step 8:

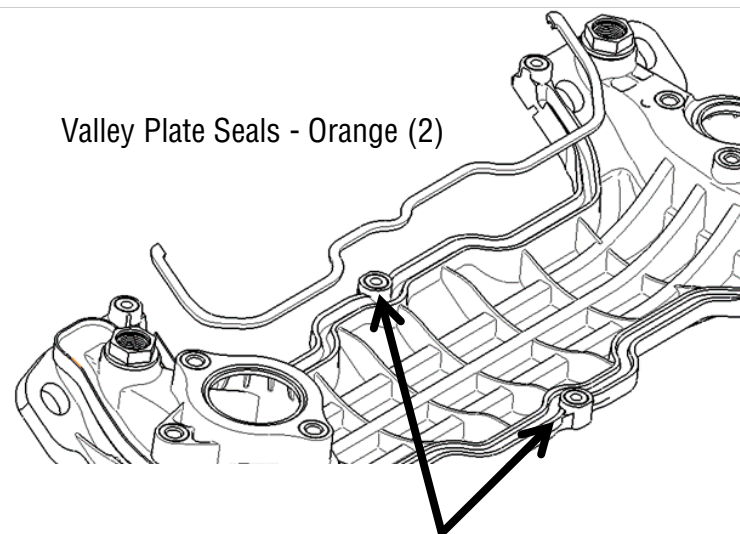
Remove the spider (2 hand-tightened bolts) and install remaining seals as shown below. Apply Dow Corning 732 silicone to the two locations shown below right.

Note: The seals provided are specifically engineered for composite manifolds; paper type gaskets will not seal properly against the cylinder head.

Port Seals – Black (2)

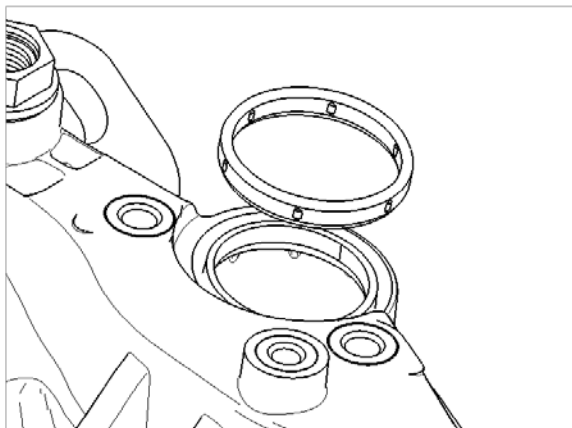


Valley Plate Seals - Orange (2)



***Apply Dow Corning 732 to both center bolt locations to prevent oil seepage.**

Distributor Seal - Blue (1)



Note: If your distributor uses an adjustable slip-collet, you must use a dab of Dow Corning 732 on top of the distributor seal at the location where the split exists in the collet or oil will seep out of the slot.

Step 9:

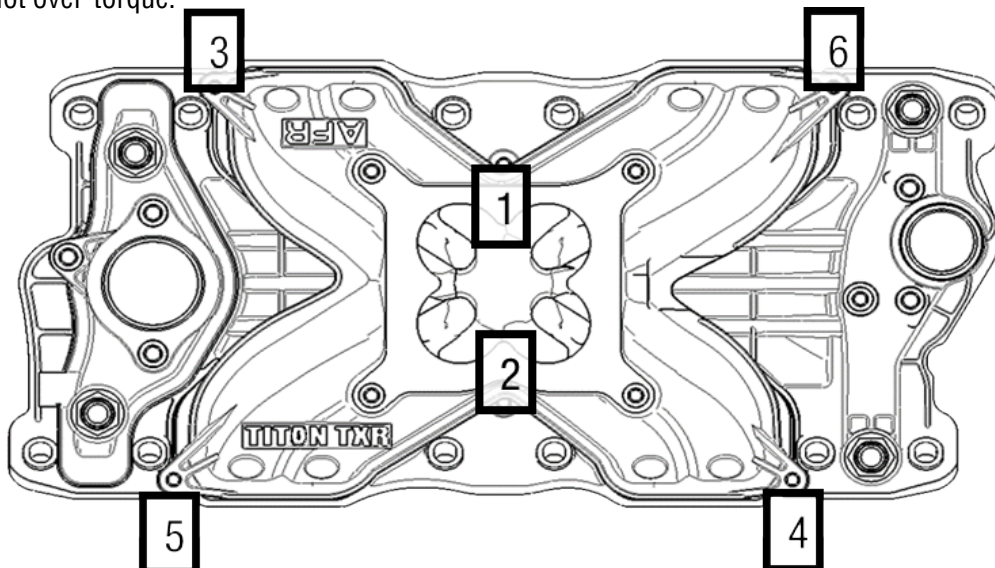
Before assembling the spider to the engine, you must apply a large dab (see picture below) of Dow Corning 732 to the location where the coolant seal gasket, port seal gasket, and valley plate seal congregate to seal oil vapors from escaping at this location. Make sure the bead of silicone covers the gap between the two seals as well as the gap between the manifold and intake interface. You can also put a small dab of silicone in the triangle at the end of the port seal gaskets to ensure a complete seal. Assemble spider to valley plate immediately before silicone can set and harden.



Step 10:

Mounting the spider to the valley plate

Apply medium-strength thread-locker to the (6) M6 bolt threads. Hand start all the bolts for the manifold spider. Tighten in this sequence, using at least 3 passes. The (6) M6 (5mm hex) bolts should reach final torque of 26 in/lbs. Do not over-torque.

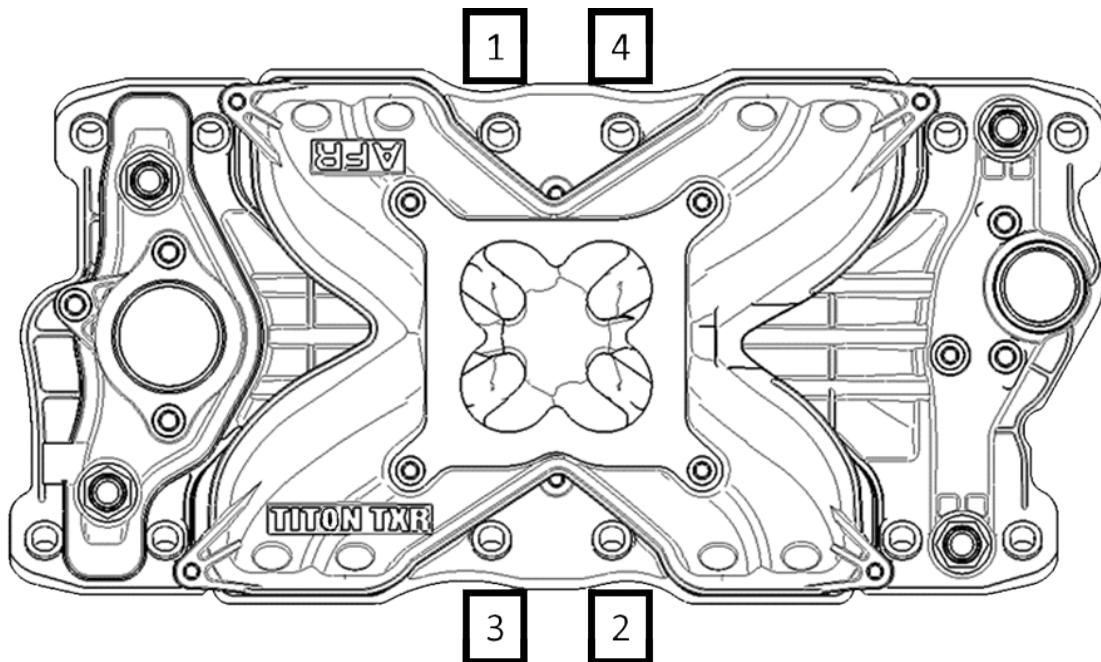


Step 11:

Finish remounting of the spider to the engine

Hand start all the bolts for the manifold spider. Tighten in the sequence shown below, using at least 3 passes. The final torque of the (4) center 3/8" bolts should not exceed 25ft-lbs.

As it will be very difficult to get a torque wrench on these fasteners, with your wrench that you plan to use for these 4 bolts, check the tightness of the previously assembled valley-plate bolts (previously tightened to 25 ft-lbs) to get a feel of what 25 ft-lbs feels like.





III. Attaching Other Parts to Your Intake Manifold

Directions on installing fittings, pipe plugs & studs:

1. Do not over-tighten or cross-thread fittings, pipe plugs, studs or bolts in your manifold. Damage to threads or a cracked mounting boss may result unless caution is used when installing accessories.
2. Use Teflon tape or PST thread sealer or equivalent for all coolant fittings.
3. Re-use carburetor studs from your stock manifold.
4. The brass pipe thread inserts are designed to rotate and include dual o-rings for sealing. While these brass inserts can rotate, it is recommended to keep rotation to a minimum as these are not intended to be dynamic seals. Use a 7/8" open end or line wrench to hold the fitting while the pipe threads are tightened.
5. Use medium-strength threadlocker on threaded fasteners to maintain bolt torque during extreme service applications.

Carburetor installation:

CAUTION: You MUST use a 1/16" or thinner carburetor gasket. For non-OEM carburetor, install according to manufacturer's instructions.

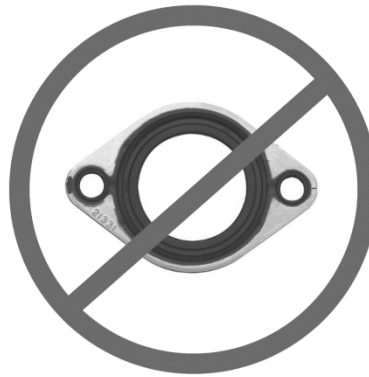
1. Connect all fuel lines, linkage and throttle springs.
2. Connect all vacuum lines. Refer to your drawing or tags for correct placement
3. Follow torque recommendations from carburetor manufacturer to avoid damage to carburetor mounting flanges. Normally, recommended torque is 10-12 ft-lbs. Regardless of manufacturer recommendation, do not exceed 12 ft-lbs torque for 5/16" nuts regardless of carburetor manufacturer recommendation to avoid damage to the spider inserts.
4. **Requires 1/16" or thinner gasket. Do not use 1/4" gasket or your inserts will pull out.**

Wiring

Connect all electrical wiring as directed by your service manual.

Thermostat:

1. To ensure proper function of your thermostat, place it in a pan of boiling water. If questionable, replace it with one for the correct year and model of your vehicle.
2. Must use thermostat housing with built-in O-ring style gasket (see picture below left). Do not use additional gaskets or your inserts will pull out (**see warning page 2; see picture below right**).
3. Install thermostat with proper orientation. Apply medium strength threadlocker on 3/8"-16 bolts. Start bolts by hand and tighten to 25 ft-lbs. Do not over-tighten.
4. Make sure radiator drain is closed. Replace coolant.
5. Reconnect battery.



Distributor:

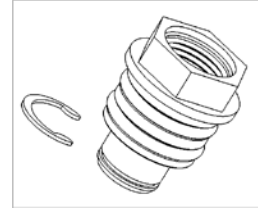
1. Use the provided distributor seal.
2. Depending upon alignment of distributor and gasket, you may wish to use Dow Corning 732 at this joint for additional security. Also as previously mentioned, if your distributor has an adjustable collet, Dow Corning 732 must be placed at this split in this joint to ensure no leakage.
3. You must use the pre-installed distributor clamp plate or your warranty will be void (picture below)
4. Start fastener.
5. Tighten hold down clamp to 12-15 ft-lbs. Do not over-tighten.



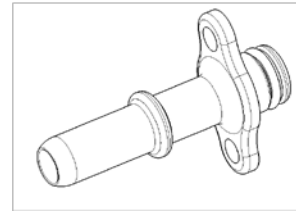
IV. Service & Replacement parts:

The seals, coolant system pipe thread inserts, compression limiters and the vacuum fitting are designed to be serviced and replaced as needed.

#4601 Replacement 3/8" Brass Pipe Insert Assembly



#4602 Replacement 3/8" Vacuum Fitting

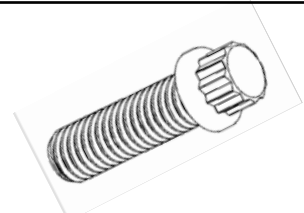


#4600 Valley Plate Compression Limiters

(**Note:** Valley compression limiters are silver in color, Spider compression limiters are gold/brass in color– do not interchange limiters between the spider and valley plate.)



#6300 Intake Manifold Bolts – 3/8" -16



#6299 Intake Manifold Bolt Washers



#4550 SBC Seal Kit

