



**A Holley Performance Brand**

# **WEIAND SUPERCHARGER INSTALLATION INSTRUCTIONS PART A**

This set of instruction sheets applies to all WEIAND small block and big block Chevrolet supercharger installations. Note that throughout these instructions, there may be sections that only apply to certain supercharger models or certain engines. These sections will be clearly marked. If they do not apply to your particular installation, skip over them. Please carefully read through these instructions before you begin an installation. (For Pro-Marine applications, see Part B). You may find that you'll need certain additional parts to complete your installation, and it will make your job easier if you have all of these parts before you begin. Additionally, we suggest that you read the Weiland Supercharger Technical Information Section (starting on page 6) before you begin. It will alert you to certain aspects of the installation that will make your finished installation as successful as possible. Should you need information or parts assistance, please do not return the unit to the store without first contacting Technical Service at 1-270-781-9741, Monday-Friday, 7 a.m. to 5 p.m. CST. Please have the part number on hand of the product you purchased when you call.

## **PARTS SUPPLIED IN KIT**

1. Supercharger assembly
2. Intake manifold
3. 2-4V Carburetor adapter (256)
4. Drive Belt
5. Drive belt idler assembly
6. Stud kit or bolt kit (Supercharger to Intake manifold)
7. Gaskets  
Supercharger-to-Manifold  
Carburetor adapter-to-supercharger (256, 671-1471)
8. Thermostat housing (Pro-Street 142 E.O. kits)
9. Offset water outlet adapter & water outlet spacer (Pro-Marine 142-177)
10. Intake manifold bolt set (256)
11. Hardware pack

## **ADDITIONAL PARTS THAT MAY BE REQUIRED**

1. Intake manifold gasket set  
Fel-Pro #1256 for small block Chevy  
Fel-Pro #1275 for big block Chevy w/ rectangular ports  
Fel-Pro #1251 Trim-to-fit for big block Chevy w/ oval ports
2. Valve cover gasket set
3. Thermostat housing gasket
4. Distributor to manifold gasket
5. 1/2"-NPT pipe plugs (2) required
6. Hi-temp non-hardening gasket sealer
7. Hi-temp silicone sealant
8. Teflon tape
9. Carburetor linkage kits
10. Thread locking compound

## **SUGGESTED TOOL LIST**

1. Socket wrench set with ratchet & extension
2. Box or open end wrenches 3/8" to 1"
3. Ignition wrench set
4. Torque wrench (ft./lbs.)
5. Screwdrivers, standard & Phillips, various lengths
6. Gasket scraper
7. Flare-nut wrenches
8. Pliers, standard & needle nose
9. Drain pan
10. 3/8"-16 tap (for cleaning intake manifold threads in head)
11. Straight-edge
12. Allen wrench set to 3/8"
13. Timing light
14. Oil pressure gauge
15. Long feeler gauges

## **PLEASE READ THE FOLLOWING CAREFULLY BEFORE STARTING INSTALLATION:**

These instructions cover the following Weiland Supercharger kits:

<b>Application</b>	<b>Weiland Supercharger Kit Sizes</b>
Small Block Chevy	142, 144, & 177
Big Block Chevy	174, 177, 250, & 256

There are some important differences between these kits. First, all Pro-Street kits listed above can be used on both long and short water pump engines, depending on the length of the blower. Short nose blowers will work on short water pumps with up to 2 "V" belts. The long nose blowers will work on both short and long water pumps with up to 3 "V" belts. To use an OEM or the aftermarket serpentine drive, you will need to modify the lower drive pulley to get the correct belt alignment.

## DISASSEMBLY AND PREPARATION

### STEP 1

Disconnect the battery. Drain the radiator and cooling system. Make sure the block is drained, as you will be removing the intake manifold. It may make the installation easier if you remove the radiator and fan shroud to gain better access. Remove the upper radiator hose from the thermostat housing. Remove the thermostat housing making note of the direction the outlet is pointing. If you are going to reuse the thermostat housing, make sure there is no leftover gasket material on the housing. Old gasket material can cause leaks. Remove the thermostat from the manifold. Disconnect the heater hoses (if present) from the manifold.

- a) Carefully remove the heater hoses from the manifold, as these are to be reused.
- b) It is usually a good idea to use new fittings and clamps.

### STEP 2

Mark which ignition wire goes to which distributor cap terminal. Disconnect the ignition wires from the distributor cap. Disconnect the distributor primary wire or the plug for the HEI distributor.

Note the position of the distributor rotor to the distributor body and of the distributor body to the engine. You may want to place a mark on the distributor for reference. This will make reinstallation of the distributor much easier. Remove the distributor from the engine. Remove the ignition coil from the stock intake manifold, if so equipped.

### STEP 3

Loosen and, if necessary, remove the accessory belts. Remove the A/C compressor, alternator, and other brackets and hardware from the intake manifold.

### STEP 4

Remove the throttle linkage from the carburetor. Note how the linkage attaches. You may need to fabricate a new throttle linkage, depending upon your linkage configuration, or you may elect to use a Weiand linkage kit. After the supercharger is installed, the carburetor will be 3 to 4 inches higher on all kits. If the vehicle is equipped with a cable type linkage, you may simply need a longer cable. Disconnect and remove the transmission kickdown and throttle pressure control linkage. If your vehicle is equipped with a 700-R4 transmission, note the distance between the carburetor throttle lever and the cable brackets, as this distance will need to be duplicated after the supercharger is installed. If the geometry of the throttle pressure linkage is improper, the transmission will not shift properly or may slip and overheat. Remove all old gasket material from the bottom of the existing carburetor, if it is to be reused. Set the carburetor aside and protect it from dirt and debris.

### STEP 5

Remove the bolts that retain the stock intake manifold to the cylinder heads. There are 12 bolts on the small block and 16 bolts on the big block. (Note: You will only be reinstalling 12 bolts on the big block Chevy 177. The 256 kits include 16 intake manifold bolts. You may find that removing one or both of the valve cover gaskets after blower installation.

**NOTE:** Valve cover gaskets are not included in the WEIAND supercharger kits.

Insert a screwdriver beneath the front or rear of the manifold to pry it away from the engine. AVOID damaging the sealing surface of the cylinder heads or block. AVOID getting water in the lifter valley of the engine.

### STEP 6

After removing the manifold, remove any debris that may have fallen into the lifter valley. Insert clean rags into the intake ports and lifter valley to catch the gasket scrapings that may fall as you clean the cylinder head and block to manifold sealing surfaces. Use a 3/8"-16 tap to clean the manifold bolt holes in the cylinder heads. This provides for a better torque reading when installing

the manifold bolts. Unless you are using new intake manifold bolts, be sure to clean the threads on the stock bolts.

### STEP 7

Remove the three stock bolts holding the lower pulley on the harmonic damper. Remove the large center bolt and thick washer from the damper. **Do not remove the damper.**

#### **Pro-Street 142, 144, 174, 177, 250, & 256:**

Clean the stock stamped steel pulley's front surface, so that the supercharger drive pulley fits squarely. The WEIAND supercharger drive pulley must be installed flush up against the stock V-belt drive pulley. Test fit the WEIAND pulley to the stock V-belt pulley. The small pilot on the rear of the WEIAND pulley should fit snugly into the center of the stock pulley. Some vehicles, particularly light trucks, use a cast iron pulley with a thicker center section and insufficient room for the supercharger pulley to fit inside. This pulley must be replaced with a similar stamped steel pulley, available at most wrecking yards or Chevrolet dealers.

**CAUTION: IF THE WEIAND SUPERCHARGER DRIVE PULLEY DOES NOT FIT SQUARELY AGAINST THE STOCK LOWER PULLEY, THE PULLEY WILL APPEAR TO WOBBLE ON THE CRANKSHAFT WHEN TURNED AND THE DRIVE SYSTEM WILL THROW DRIVE BELTS.**

### STEP 8

#### **Pro-Street 142, 144, 174, 177, 250, & 256:**

Align the holes and place the V-belt pulley and the blower drive pulley assembly on the damper. Install the supplied crank bolt (7/16"-20 x 4" on the small block, 1/2"-20 x 4" on the big block) with the supplied thick washer into the center of the crankshaft. **Do not use the thick factory washer on the center bolt.** Install the supplied three 3/8" bolts and 3/8" flat washers and tighten them finger tight. Torque the supplied 7/16" center bolt to 60 ft./lbs. Torque the 1/2" bolt to 80 ft./lbs. Torque the three 3/8" bolts to 30 ft./lbs.

### STEP 9

The WEIAND Supercharger intake manifold should be thoroughly washed prior to installation. Be sure to remove any foreign matter, such as chips, dirt, polishing, dust, or packing material from both the intake runners and the exterior of the manifold.

#### **Pro-Street 177 & 256**

Note: It may necessary to drill and tap the hole in the manifold for the boost gauge before installing the manifold on the engine.

### STEP 10

WEIAND does not include intake manifold gaskets in the kit, but recommends that you use a Fel-Pro intake manifold gasket set as follows:

- Big Block Rectangular Port: #1275
- Big Block Oval Port: #1251 Trim-to-fit
- Small Block: #1256

The above gasket recommendations are for stock ports. If the ports in your heads and/or manifold have been enlarged, consult the Fel-Pro catalog or your engine builder for the correct gasket. WEIAND recommends these gaskets because of their exceptional sealing quality with aluminum manifolds.

Install the port gaskets per gasket kit instructions. **Do not use cork or rubber end gaskets.** Use a bead of silicone sealer both front and rear. Place the manifold on the engine, using a brass dowel or large Phillips screwdriver to align the bolt holes. DO NOT displace the gaskets when moving the manifold and do not damage the threads in the cylinder head. Install all the intake manifold bolts. Hand tighten only at this time.

If the valve covers were removed earlier, you may reinstall them at this time. Fit-check valve covers before torquing manifold. Following the proper tightening sequence (as shown in a typical shop manual), torque the intake manifold bolts in two steps. First torque all bolts to 15 ft./lbs. Then torque the intake manifold bolts to 30 ft./lbs. It is advisable to use new gaskets to prevent any leakage.

Install the thermostat into the intake manifold. Make sure that the thermostat is pointing in the correct direction. If the thermostat is installed upside down, overheating will result. For most early applications, you can reuse the stock thermostat housing. Late model applications with the Pro-Street 142, 144, 174, & 177 that are using the stock smog fittings located on the original thermostat housing must use the WEIAND thermostat housing (#6200 Satin, #6201 Polished). **Note:** This style thermostat housing is included in the following kits: 6502-1, 6503-1, 6504-1, 6507WIN, 6508WIN, & 6509-1. If you use this housing, remove the thermostat mounted temperature controlled sensors from the stock housing and install them into the WEIAND housing. These fittings can be somewhat fragile, so be very careful not to overtighten or damage the fittings during installation. Vehicles equipped with late model radial style air conditioning compressors may require this housing so that the compressor brackets will not interfere with the upper radiator hose. On the 142, 144, 174, & 177, this is a good time to install the temperature sender and the heater hose fittings. If you wish to use the WEIAND thermostat housing, but do not need to use the smog sensors, the sensor bosses can be plugged using 1/2" NPT plugs.

Install the thermostat housing on the manifold using a new gasket and stock bolts. Torque bolts to 15 ft./lbs.

#### STEP 11

All WEIAND superchargers come equipped with the drive pulley best suited to produce a boost pressure of approximately 5 to 7 psi for most basic factory stock engines. See charts on page 13 for optional drive pulleys.

In order to remove the installed blower pulley or to install an upper pulley on the blower, remove the shipping cover from the top of the blower and insert a clean rag between the rotors. This will gently jam the rotors to allow removal or installation of the pulley bolt and washer from the front of the supercharger input shaft on the Pro-Street blowers.

On the all kits, slide the pulley forward off the shaft. Slide the new pulley on the drive shaft. Be sure to keep the 3/16" key on the shaft when installing the new pulley. **Do not use a hammer to install the pulley on the shaft.** Place a drop of thread adhesive, such as Loctite, on the pulley retaining bolt threads. Reinstall the pulley retaining bolt with washer into the drive shaft. Tighten this bolt to 30 ft./lbs.

#### STEP 12

##### **Pro-Street 142, 144, 174, & 250:**

Locate the supercharger to intake manifold gasket onto the manifold surface. The gasket can be coated with talcum or baby powder to prevent sticking to manifold or supercharger. **Do not use any type of gasket sealant, as this will void your warranty.** Remove tape from the bottom of the blower. **Clean off any tape residue with solvent.** DO NOT let any foreign matter, dirt, or debris into the rotor housing, as this will cause **severe damage** to the rotors and housing. Set the blower onto the manifold, being careful not to dislodge the gasket. Install the four long mounting bolts and tighten to **10-12 ft./lbs.** using a criss-cross pattern.

##### **Pro-Street 177 & 256**

Install the supercharger to intake manifold mounting studs into the manifold. There are six 5/16" x 1-1/2" for the 177, eight 5/16" x 1-3/4" for the 256. Tighten to 10-12 ft./lbs. NOTE: If you are using a WEIAND linkage kit, install the two extra long studs supplied with the linkage in place of the studs that came with your supercharger kit. See "Linkage Instructions" for location of these studs. Place the supercharger to manifold gasket (O-ring on the 256) on the manifold. The gasket or O-ring can be coated with talcum or baby powder to prevent sticking to manifold or supercharger. **Do not use any type of gasket sealant, as this will void your warranty.** If you have not already done so, remove the tape from the bottom of the supercharger. **Clean off any tape residue with solvent.** DO NOT let any foreign matter, dirt, or debris into the rotor housing, as this will cause **severe damage** to the rotors and housing. Set the supercharger on the manifold. Install the six or eight supercharger hold-down nuts (and WEIAND linkage bracket, if applicable) and tighten in sequence to **10-12 ft./lbs.** using a criss-cross pattern.

#### **IMPORTANT NOTE FOR ALL WEIAND SUPERCHARGERS:**

While you are tightening the supercharger to the manifold, turn the supercharger driven pulley (which is the pulley attached to the supercharger) to make sure the supercharger does not bind up. Supercharger bind is caused by the blower case distorting when it is **OVER-TORQUED**. If the supercharger does bind, loosen the bolts or studs and retorquer, following the same procedure.

#### **IMPORTANT:**

**On the 142, 144, 174, 177, & 256,** use long feeler gauges to determine any changes in running clearances after you tighten down the supercharger. The proper way to check these clearances is as follows:

##### **Pro-Street 142, 144, 174, 177, & 256:**

Use the long feeler gauges to measure the clearance. This clearance is preset at the factory. If the supercharger is **over-torqued** on the manifold, variation can occur, causing rotor to case interference (binding). If **under-torqued**, vacuum and boost leakage can result.

If you have not already done so, remove the tape covering from the top of the supercharger. Clean the surface of the supercharger so there is no excess glue.

Bringing the two feeler gauges together (.004" and .008"), insert the .012" combined feeler gauges into the supercharger no more than 1/2" past the edge of the opening. Check the rotor to case clearance all along both of the upper edges of the case, from front to back, making sure there is no bind along that edge. If the rotor binds against the feeler gauges, the supercharger should be loosened from the manifold, rechecked, and slowly retorqued, repeating the above step.

#### STEP 13

Install the air conditioning and alternator brackets on the manifold.

##### **Pro-Street 142, 144, and 177 for Small Block Chevy:**

Use the stock accessory brackets. There are two similar, but distinctly different alternator brackets used on most long water pump applications. The WEIAND Pro-Street supercharger manifold will not accept the longer of the two brackets. The shorter bracket is available through most wrecking yards or from your Chevy dealer and is required on all long water pump applications. Note that the mounting bracket that bolts to one of the thermostat housing bolts will not work with this supercharger.

##### **Pro-Street 174, 177, and 256 for Big Block Chevy:**

Check if any of your stock brackets will work. If not, you will have to use aftermarket accessory brackets that are available from a number of manufacturers. One company that offers a wide variety of accessory brackets specifically designed to work with WEIAND superchargers is Street & Performance (501-394-5711).

#### STEP 14

##### **Pro-Street 142, 177, & 256:**

Install and tighten the accessory belts. Slip the WEIAND supercharger drive belt around the lower (drive) pulley and fan.

Pull the idler/tensioner arm down using a 3/4" box or socket wrench on the idler pulley nut. Slip the belt around the idler pulley and upper (driven) pulley, then release the tensioner arm. The supercharger drive belt now has the correct tension. Make sure the belt is aligned in the grooves of each pulley and is not touching or rubbing on any of the accessories or stock pulleys. In rare instances, some vehicles may require a smaller diameter water pump pulley to avoid interfering with the path of the supercharger belt.

#### STEP 15

Some installations may require a short fan spacer (available at most auto parts stores) that allows the fan to clear the supercharger drive belt. The supercharger belt should be 3/8 to 1/2" away from the fan. The fan should not be placed any closer than 3/8" from the radiator. We recommend using the original clutch fan, but there are several quality aftermarket flexible blade fans that are suitable. If there isn't enough room between the

supercharger drive belt and the fan, and space is available in front of the radiator, an electric cooling fan mounted in front of the radiator may be an alternate solution.

Install the radiator, hoses, and coolant. Follow the coolant manufacturer's instructions to determine the proper water and antifreeze mix. Proper cooling is essential on a supercharged application. Every effort must be made to make the cooling system as efficient as possible; this includes the use of a fan shroud. If your vehicle comes equipped with a fan shroud from the factory, you should retain it.

#### STEP 16

Install the distributor. Be sure to use a new distributor gasket. Make sure the distributor sits all the way down on the manifold. Use the stock distributor hold down assembly. Install the distributor housing and rotor to the position noted prior to removal. Reconnect the spark plug wires in the order removed or refer to the factory service manual for correct firing order. Install the coil on the WEIAND manifold. The stock coil bracket will fit the WEIAND manifold in most applications.

#### STEP 17

##### Pro-Street 142, 144, 174, & 177:

Install the desired carburetor gasket on the supercharger. If you wish to use a spreadbore type carburetor, clearance between the large, secondary throttle blades and the supercharger housing will have to be checked (some spreadbore carburetors have larger secondary throttle blades than others). Using the gasket supplied, place the carburetor on the supercharger and open the secondary throttle blades fully. If the throttle blades hit the case, a carburetor base gasket of 1/8" thickness or more will have to be used. Holley carburetors, using the 50cc REO accelerator pump, may require using at least two regulator carburetor base gaskets, so the accelerator pump actuating arm will not hit the supercharger case. Make sure the carburetor throttle blades and linkage do not bind against anything or become jammed. Partial throttle will result in partial performance. A throttle that is jammed open can be an extremely dangerous condition.

##### WEIAND Pro-Street 256

These supercharger kits come standard with a 1" thick dual 4V inlet adapter that utilizes two carburetors. WEIAND offers a dual adapter separately that is 2-3/4" thick (#7164).

#### STEP 18

Install the throttle linkage to the carburetor. Some later model applications may be able to use the stock type throttle cable or a similar longer cable. Rod and lever linkages may require a little modification to the carburetor lever and some linkage components to make the throttle lever work properly.

#### REMEMBER: FULL THROTTLE IS ESSENTIAL FOR MAXIMUM PERFORMANCE.

If you have an automatic transmission with a mechanical or electric kickdown, be sure that the kickdown is adjusted properly. The 700-R4 has a throttle pressure cable. This MUST be installed and adjusted properly or the transmission will slip under load and shift erratically, possibly causing transmission overheating and failure. In addition, the throttle pressure cable must allow for full throttle movement or full throttle performance will be impaired. Note that very minor adjustments in this cable can make a huge difference in transmission performance. In all cases, refer to the factory service manual for proper adjustment procedure.

Install a longer fuel line to the carburetor. WEIAND recommends using a high flow in-line filter. Remove any screen type filter in the carburetor. **Minimum fuel pressure of 5 lbs.** is necessary at wide-open throttle.

Make sure the fuel line is well away from hot exhaust components or sharp edges. Use only an approved fuel line.

Connect the power brake vacuum line to the CARBURETOR BASE. **DO NOT** use a T-fitting to connect the power brake booster line to the same carburetor fitting as the PCV valve. This can lead

to a low vacuum condition in the brake booster reservoir and may cause the brakes to need unnecessary pedal effort.

**DO NOT** connect the brake booster vacuum line to the intake manifold.

#### STEP 19

Install the desired air cleaner. Some stock air cleaners require a preheat tube from the exhaust to the inlet of the air cleaner housing. This tube permits faster warm-up. The supercharger's rotors provide good atomization of the fuel as it passes through the blower, meaning the choke and preheat tube may not be as functionally critical on a supercharged application. Make sure the air cleaner lid is not restricting the air flow into the carburetor opening. The lid should be at least 1" higher than the choke tower of the carburetor.

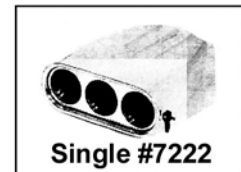
You should use as large an air cleaner as possible. Too small an air cleaner can result in poor performance due to insufficient flow capacity or by causing a full throttle restriction. Check out WEIAND's full line catalog for a complete listing of high performance air cleaners.

**DO NOT** drive the vehicle without an air cleaner. Foreign particles entering the supercharger will cause **severe damage** to the rotors and housing and **void the warranty**.

**To complete your supercharger installation consider WEIAND's Hiborn or Enderle style polished cast aluminum air scoops featuring a greater frontal area for increased air intake. Air scoops come with WEIAND's exclusive 3" air cleaner(s).  
Hilborn Style**



#### Enderle Style



#### STEP 20

After all the connections and fittings are in place, start the engine. Check carefully for coolant, oil, gasoline, or vacuum leaks. Adjust the idle.

Be sure to set the spark timing using a timing light. Setting the timing "by ear" is imprecise and can cause engine damage due to detonation or pre-ignition.

Do not run more than 34° of total timing. See the Weiland Supercharger Technical Information Section for more details on setting the ignition timing.

#### STEP 21

The stock engine idle will not be affected by the installation of the supercharger. Under normal circumstances, there will be some noise generated by the supercharger. Should the noise seem excessive, immediately turn off the engine off and investigate. If the noise is noticeable at idle, but goes away as the RPMs increase, this is normal.

## MAINTENANCE SECTION

The WEIAND Supercharger is designed to provide a substantial increase in performance with a minimum of maintenance. Regular maintenance will provide many miles of trouble-free driving. The most critical aspect of your supercharger is oil level. The level should be checked each time you check the engine oil level. Oil levels on various Weiland blowers can be checked as follows:

### WEIAND Pro-Street (all kits):

Front reservoir: Check oil level in the sight glass in the front cover. Fill with oil from the top fill plug to the bottom of the sight glass.  
Rear reservoir: These units use sealed bearings in the rear. They do not require lubrication.

You also should check the condition of the supercharger drive belt. Turn the belt so you can see the grooves or the teeth. The grooves or teeth should appear slightly rough, but have no missing or excessively worn ribs. The belt should not have oil or dirt on it. Make sure the belt is kept clean. The blower belts supplied in WEIAND Supercharger kits normally will last for extended periods of time before replacement. Belt breakage or failure in street applications is highly unlikely. **Carrying a spare belt normally is not required, because the vehicle will run adequately without a belt.**

### TIMING AND CARBURETOR RECOMMENDATIONS

The worst enemy of a supercharged engine is detonation. Detonation, combined with continued high RPM use, can quickly damage a healthy engine. This condition **MUST** be eliminated. Detonation can be caused by overly advanced ignition timing, poor grade/quality of fuel, excessively high compression ratio, cylinder cross-firing, or too much boost relative to the static compression ratio.

We have found that a good starting point for the ignition timing is to run 6 to 10° of initial advance (static timing advance) with about 22 to 24° of mechanical advance in the distributor, for a total of 28 to 34° of advance, which should be all in by 2500 RPM. If uncertain as to what the initial ignition timing should be for a particular engine, set the timing to the lower figure for initial start-up. Once the engine has been started, the timing can then be adjusted for optimum performance. With too much advance, detonation may occur, which could lead to engine damage. If the ignition timing is set too retarded, the engine will tend to run hot, feel unresponsive, and use an excessive amount of fuel. Dwell, if applicable, should be set to factory specifications.

The correct carburetor for the engine is also dependent on a variety of conditions. We have had very good results with 700 to 850 CFM mechanical secondary carburetors. These carburetors are large enough to adequately feed the majority of supercharged installations and are versatile enough to adapt to most smaller engines. In any case, we recommend that you use a mechanical secondary carburetor for street applications. Here are some recommendations for street engines:

Blower Size	Engine	Approx. Required CFM*	Holley Carb(s) P/N	Holley HP Carb(s) P/N
142	CSB 350	700	0-80572S	0-80576
144	CSB 350	700	0-80572S	0-80576
174	FSB 302	750	0-80573S	0-80576
177	CBB 454	800	0-80574S	0-80576
250	CBB 454	(2) 750	0-80573S	0-80576
256	CBB 454	(2) 750	0-80573S	0-80576

Note that larger engines may require larger carburetors. Higher boost setups will also require carburetor sizes at the upper end of the ranges given above.

If you use a mechanical secondary carburetor and your vehicle is equipped with an automatic transmission, you may need to install a higher than stock stall speed torque converter or a numerically high rear end ratio that the engine can respond to sudden full throttle operation, rather than the more gradual operation than vacuum secondary carburetors provide.

If your vehicle is equipped with a standard transmission, rapid initial movement may require engaging the clutch at a higher RPM.

**NOTE: REFER TO THE TECHNICAL INFORMATION SECTION (PAGE 6) FOR ADDITIONAL DETAILS.**

# WEIAND PRO-MARINE SUPERCHARGER INSTRUCTIONS PART B

When installing a WEIAND Pro-Marine Supercharger (142, 177, or 256), follow the basic installation instructions on the previous pages, while incorporating the following unique marine characteristics.

### THERMOSTAT HOUSING

The Pro-Marine 142, 144, 174, and 177 Supercharger Kits include a special Offset Water Outlet Adapter and Water Outlet Spacer that permit the use of the stock Mercruiser thermostat housing, as well as similar aftermarket marine thermostat housings.

On the Pro-Marine 256, if you currently have a Mercruiser Marine engine and you wish to utilize the stock Mercruiser thermostat housing or a similar aftermarket marine thermostat housing, you will need WEIAND's optional 256 Offset Water Outlet Adapter, #6240 (Satin) or #6241 (Polished). As an option, you can purchase a special thermostat housing that Mercruiser uses on certain other supercharged engines. This particular housing will bolt directly to the front face of the WEIAND 256 manifold and permits utilization of all stock Mercruiser plumbing.

When using these various water outlet adapters, in most instances the stock water hoses will need to be lengthened.

### CRANKSHAFT PULLEY ASSEMBLY

Mercruiser marine engines use two types of crankshaft V-belt pulleys. One is aluminum, and one is steel. All of WEIAND's Pro-Marine supercharger kits are supplied in two versions: one for the steel pulley and one for the aluminum pulley engine.

If your engine has the steel pulley, follow the instructions in the main part of this booklet. If your engine uses an aluminum pulley, remove the stock aluminum accessory pulley and replace it with the supplied WEIAND 3V-belt accessory pulley mated to the WEIAND serpentine supercharger drive belt pulley. Loosely install the accessory V-belts and the 3V pulley and serpentine drive pulley using the supplied crankshaft bolt and thick washer into the center of the crankshaft. Then install the three supplied pulley bolts into the harmonic damper. Torque the center crankshaft bolt to 60 ft./lbs. Torque the three pulley bolts to 30 ft./lbs. Then adjust the three accessory belts to the proper tension.

### FUEL AND IGNITION SYSTEMS

Follow the carburetor size recommendations given in these instructions. Since most pleasure marine applications are usually operated at RPMs below 5500, you can usually choose your carburetor from the low end of the recommended size range. Additionally, if your application calls for a Coast Guard approved carburetor and spark arrestor style air cleaner, make sure that you use Coast Guard certified products.

To avoid engine damage, your carburetor **must** be modified for marine use. We strongly recommend that you either have your carbs modified by, or purchase carbs from, a marine specialist who is experienced in supercharged applications. The most important modification is commonly called "boost referencing the power valve." If you do not have this modification, here is what can happen:

At part throttle planing speed, your engine will be producing some boost, but the carburetor can still have a high amount of vacuum under it. In this condition, this high vacuum signal will not allow the power valve to operate properly and the correct amount of fuel will not be delivered for the boost provided by the blower. A lean condition can result with possible engine damage.

There are a number of carburetor specialists who have experience in supercharged marine applications. If you need help locating someone, please call the Holley Technical Service department for recommendations at (270) 781-9741.

We recommend that you utilize some type of detonation alert device to detect any spark knock. We do not recommend the use of a boost retard system. While these systems are fine for street vehicle applications where the ignition typically is retarded for short periods of time. In marine use, where the blower is basically in the boost mode all the time, running the ignition constantly retarded under power will cause the engine to run hot and lead to exhaust valve failure.

The stock ignition system on most Mercruiser marine engines is not suitable for use with a blower. Replace the stock V-8 module with one of Mercruiser's V-6 modules that will provide the proper operating advance. We recommend a total of 28° of advance. Contact Holley Technical Service at (270) 781-9741 for additional information on marine ignition systems.

Fuel lines should be a minimum of 3/8" i.d. and the fuel pump should provide 6 to 7 psi at wide-open throttle. Fuel pressure gauges may be mounted directly on the engine or on the dash using an isolator. Note that insufficient fuel flow is the single biggest contributor to engine failure on supercharged marine engines, so it is very important to make sure that your engine is receiving the proper amount of fuel at wide-open throttle.

It is possible that on certain stock marine installations, the existing fuel pump and fuel lines are inadequate. We recommend an electric pump that is rated at least 130 gph, and it should be a Coast Guard approved marine rated pump. Additionally, stock fuel filters or water separators may be overly restrictive and may have to be replaced with units that provide more fuel flow in order to maintain a minimum of 6 psi fuel pressure at wide-open throttle.

If you incorporate a fuel pressure regulator into your fuel system, we recommend that you use a high-flow unit, such as Holley P/N 12-803 for single carb installation or Holley P/N 12-707 for a two carb installation.

Once you have your marine supercharger installed, we strongly recommend on your initial test run that you hook up a fuel pressure gauge where the boat operator or passenger can observe it while the boat is under full power. This could even be a temporary hookup just for test purposes.

When the boat is taken to wide-open throttle, you must maintain a minimum of 6 psi of fuel pressure at the carburetor. If you do not have at least 6 psi, do not continue to operate the boat until the proper fuel pressure is produced. Inadequate fuel pressure can usually be traced to one or more of the following problems:

1. Fuel pump is too small. (Use 130 gph marine-rated pump.)
2. Fuel lines are too small. (Use 1/2" lines and fittings.)
3. Restrictions in the system:
  - A. Water separator (Fram or Mercury Marine high-flow units are required.)
  - B. Fuel pressure regulator (use a Holley P/N 12-803 for single carb or Holley P/N 12-707 for dual carbs.)
4. Inadequate vent in fuel tank. (Install a larger vent.)

**NOTE:** It is extremely important that proper fuel pressure is provided to a supercharged marine engine. Otherwise, severe engine damage can occur if the engine is run too lean.

While a 130 gph rated fuel pump is technically much larger than what is required in most applications, experience has shown that this is an area where it is advisable to incorporate a significant safety factor to avoid any fuel supply problems.

## PROP CHANGES

With additional horsepower available from a blown engine, you can typically run a prop with more pitch. Assuming that you had the correct prop on your engine before the blower was installed, you can typically add 1/2" of prop pitch per additional 300 RPM increase achieved with the blower.

Additionally, you may find that performance is improved by going from the three blade prop to a four blade prop. This will reduce the tendency for prop cavitation caused by rapid throttle advancement at low boat speeds.

## BLOWER BOOST

Weiland Pro-Marine supercharger kits can be installed on a stock engine as long as the static compression ratio is 8.5:1 or less. The engine speed should be limited to 5500 RPM. Most stock engines are equipped with cast pistons, cast crankshaft, two bolt main caps, and a small camshaft, requiring you to run very low boost pressure, 2 to 4 lbs. maximum. Higher boost levels **will** cause detonation and engine failure.

You may elect to run a different blower drive ratio than that supplied in your kit. If so, please consult the charts or the Weiland catalog for details on optional pulleys available. Also, be sure to read the section on boost in the Weiland Supercharger Technical Information Section below.

Note that marine applications should not get too aggressive on boost pressure. Because marine engines essentially are in boost all of the time (compared with street driven vehicles, which only see boost for short periods), it is preferable to keep the maximum amount of boost in the 4 to 7 psi range. If you attempt to run excessive amounts of boost on a marine engine, you may experience problems with burned valves or piston damage.

# TECHNICAL INFORMATION

## TECHNICAL MANUAL

The purpose of this section of the installation instructions is to provide the owner with an overview of mechanically driven superchargers - their operation, characteristics, and advantages. This section points out what to expect from your blower and how to get the most from your blower in longevity and performance.

The Weiland Pro-Street blowers have good efficiency at speeds and pressures normally used on the street. These Weiland blowers are not designed as a full race blower, but rather a compact and lightweight system, which will install on your engine with little or no modification

## OPERATION

When driving a vehicle equipped with the Weiland supercharger you will have more engine torque available at all engine speeds. It will be very responsive to accelerator pedal movement and will not have any of the lag associated with other types of superchargers.

If you have fitted a manifold vacuum/boost gauge you will notice that under most driving conditions the gauge will remain in the vacuum range. It will show a manifold boost from about half to wide-open throttle (WOT). The manifold boost at WOT will change with engine speed, being the greatest at high engine speeds. However, there will be enough boost in the low to mid speed range to greatly improve the acceleration of the vehicle.

There will be very little noise from a serpentine supercharger, except at WOT. Since the Poly-V belt is quiet it does not add noise to the blower as a Gilmer belt does. There may be some additional noise from a new blower while the Teflon seals are seating in.

The Weiland Pro-Street 142, 144, 174, & 177 kits are designed to use a single four-barrel carburetor. The original stock carburetor used on the engine higher flow capacity carburetor will usually increase top end power. Stock carburetors are usually more than adequate up to 4,500 to 5,000 rpm with 5-6 psi boost.

The Weiand Pro-Street 250 & 256 uses either one or two four-barrel carburetors. See the carburetor section of this manual for carburetor flow recommendations.

There may be a flat spot or hesitation when the throttle is opened quickly with the supercharger, particularly with larger displacement engines. This can be corrected by increasing the volume of the accelerator pump shot. On a Holley carburetor the 50 cc large accelerator pump kit can be installed.

### HOW IT WORKS

All roots type superchargers function in a similar fashion, the minor differences are in the shape and number of lobes used. A roots-type blower is an air pump. Air from the carburetor side is drawn into the housing by the rotors, pushed to the outlet side, and compressed in the manifold. Each complete revolution of the blower will produce four pressure pulses. These occur when the rotor tips pass the blower outlet port edge. The GMC 71 series blowers have three lobes and the rotors are helically cut. Both these features serve to somewhat quiet the pulses, but make for a more complex and expensive blower.

The quantity of air that the supercharger will move and the displacement of the supercharger is determined by the volume of air that is trapped between the rotor and the housing. Four of these volumes of air are moved every revolution of the blower. If the quantity of air that is pumped by the blower is more than the quantity of air that would normally be drawn in by the engine, the additional air will pressurize the intake manifold and produce boost.

The reason a large engine can produce more torque and power, all else being equal, is that it can convert more air/fuel mixture to energy per revolution than a small engine. A blower simply assists a small engine in "breathing" like a big one. The pressure ratio of the blower is roughly proportional to the ratio of power increase.

### DETONATION ELIMINATION

The increase in engine output with a Weiand supercharger does have the potential of causing serious engine problems (in one area), detonation, knock, or engine ping. The blower will increase the effective compression ratio of the engine. A 7 psi blower pressure will raise a 7.5:1 compression ratio to an effective 9.8:1 compression ratio. An 8.5 compression ratio will be raised to an effective 11.2:1, and a 10.0:1 compression ratio will be raised to an effective 13.5:1 ratio. See the chart on page 11 to determine your effective compression ratio.

This higher effective compression ratio of the engine makes detonation a potential problem, particularly with the lower octane fuels that are now available. There are several methods that may be used to keep detonation under control, but it is essential that there be no detonation. A very limited amount of detonation will result in severe damage to the engine. A supercharged engine will be much less tolerant of detonation than a normally aspirated engine.

The basic means of controlling detonation are compression ratio, spark advance, fuel mixture, and water injection. A lower compression ratio is the best way to control detonation, but this may require building a special engine. For normal street use with the boost pressure in the 5-7 psi range, a compression ratio of up to 8.5:1 can be used, although some spark retard may be needed.

Spark retard will always reduce detonation, although it is best for the spark to be retarded only when the supercharger is producing boost and to have more spark advance at part throttle. This improves the part throttle performance and the fuel economy. There are several ways to reduce the spark advance under boost without reducing the part throttle spark advance.

Holley offers an electronic boost retard unit (P/N 91070). This unit will retard the timing from 1° to 3° (adjustable) per pound of boost. This unit is compatible with all single-coil inductive ignition systems. It will not work with capacitive-discharge ignition systems.

We have achieved our best results with 12 to 20° of initial lead with a total lead of 32 to 36°. The advance should be in by 2,000 to 2,500 rpm. Excessive ignition timing will not produce appreciably better performance and can be potentially very harmful.

A richer fuel mixture will reduce detonation, but will have only a limited effect compared to spark retard. It is always desirable to have the WOT mixture on the rich side for any supercharged engine to reduce piston failures.

Octane booster additives can give a substantial increase to the octane of pump fuel. A series of tests were run at San Diego State University where different "octane booster" additives were added to 92 octane Super Unleaded gasoline and the octane number of the fuel was measured on a supercharged CFR engine. The highest measured octane was 104.5 for Moroso 2 additive mixed 16 oz. of additive to 22 gallons of gasoline. This is a gain of 12.5 octane numbers. Other additives that were checked gave smaller, but still significant gains in octane. This however can be expensive. The Moroso 2 additive in the concentration tested adds about \$0.65 to the cost of each gallon of gasoline. Higher octane, leaded, "racing" gasolines with octane ratings of 107 or higher are also available in most areas, but these gasolines are also very expensive. Generally, both the racing gasolines and the octane booster additives are too expensive to consider for the everyday street driven vehicle.

### ENGINE COMPONENT RECOMMENDATIONS

It is not necessary to build a special engine to go with a Weiand supercharger if the boost is limited to the 5-7 psi range. Above that boost, the engine will need a lower compression ratio. Even a specially built engine does not need to use O-rings between the head and block, dead soft copper gaskets, or other "tricks" used with blown engines. The engine requirements for using a blower are much simpler than most people expect. Good oil pressure, proper cylinder sealing (rings and valves), oil control, an adequate radiator - usually the factory original, an ignition system in proper working order, and a properly sized carburetor are all that one needs to effectively use a supercharger.

For a higher boost (9-12 psi) engine, other than forged low - compression pistons, there are few special parts required. It is not necessary to use forged crankshafts or four-bolt bearing caps on a blown engine, since the high loading of these parts comes from high engine speeds, not high cylinder pressures. A supercharger produces extra power in the normal speed range and does not have to be turned to high engine speeds, as is normally required for a high-output unblown engine. We have found that Fel-pro head gaskets with a wire-sealing ring work very well in a blown engine. We have also had very good results with Lunati Pro-Series and Sealed Power Speed Pro Plasma Moly-coated piston rings.

### CAMSHAFTS

High overlap camshafts are actually detrimental to a supercharged street engine's performance. The longer the exhaust and intake are open at the same time, the more usable air/fuel mixture is blown out the tailpipe. We have found that a cam with a 114° lobe centerline works best on a street-driven vehicle. When choosing a cam profile to work well with a blower, moderate lift and duration is desirable, but excessive overlap is undesirable. Cams generally produce additional power only at higher engine speeds usually above 4,500 rpm. If higher engine speed performance is not desired, a stock cam is actually better than a modified cam.

Holley offers a line of Lunati street supercharger cams for small and big block Chevrolet engines. The Camshaft (P/N 01006LSK) for the small block Chevrolet is a streetable cam with a reasonable idle, plenty of vacuum and very good mid and top range power. The Camshaft (P/N 02006LSK) for the big block Chevrolet has a slightly rough idle, acceptable vacuum for most street applications, and outstanding mid and top range power.

Valve springs are more critical on a blown engine than on a normally aspirated one, since you have supercharger boost pressure acting on the backside of the intake valve, trying to push

it open. You need stronger valve springs with a supercharger. Special valve springs are included with all Lunati cams.

### CYLINDER HEADS

Enlarging and polishing the intake ports of a cylinder head is of medium value on a supercharged street engine. While it cannot hurt performance, whatever gain you may see from this type of modification may not be worth the trouble and expense. A free breathing exhaust system has always been a big performance plus, and is a good idea with a supercharged engine. Engines with small stock exhaust ports (such as 302 and 351-W Fords) will improve with opened up exhaust ports. Headers do not provide as great an increase with a blown engine, as on a normally aspirated engine, but do help performance. Larger valves only increase the engine output above 4,500 rpm or so, but they do not hurt performance at any speed. Increasing the exhaust valve size usually gives greater increases in performance than increasing the intake valve size. Expect to see a boost drop with a good flowing set of heads. Despite the boost drop, the engine performance will increase.

### AUTOMOTIVE IGNITION SYSTEMS

A "hot" ignition system, especially one equipped with a knock sensor, will be an asset to a supercharged engine, especially when producing more than recommended boost. A capacitive discharge, electronic or high-energy system will be a very worthwhile addition to your engine. If you are installing a blower on a late model engine with computer-controlled spark advance, it is necessary that all elements of the engine computer control system are operational or else the computer may not provide the correct spark advance. If this is not possible, it will be necessary to replace the computer-controlled distributor with an earlier model for the same engine that has mechanical spark advance in the distributor. You can use either an OEM distributor or an aftermarket performance distributor. We have found that for all of the engines that we have dyno-tested, that the best power is obtained with 32° of total spark advance, with the entire advance coming in by 2,800 rpm. This is the maximum power with 108-octane race gasoline. You will probably not be able to use this much advance with pump gasoline. Our tests have shown that dropping the total spark advance back to 25° results in a loss of only two percent of power and torque up to 4,000 rpm and four percent of power and torque at 5,500 rpm. For this small loss in power, there will be a considerable reduction in detonation. With a boost retard system, such as the Holley #91070, you can use full advance in the distributor and have the spark retarded when the boost comes in.

### MARINE IGNITION SYSTEMS

The ignition system is another area needing careful attention to provide trouble-free operation with a supercharged marine installation. Most Mercruiser engines utilize a Thunderbolt Ignition Module. While this can vary based on the engine's horsepower rating, most of these modules are set up with 24° of ignition advance. The typical module also has 10° of initial timing for a total advance of 34°. For the average supercharged marine engine, this is too much. We recommend from 26 to 30° of total advance, depending on upon the application. The higher the compression ratio or the higher the boost, the less total timing you want to run.

If the stock ignition module is retained and the total distributor advance is retarded to the 26 to 30° range, this could leave you with as little as 2 to 4° of initial advance. This is not enough and will make the engine difficult to start, provide a poor idle, and contribute to excessive backfires. Backfires not only destroy the power valves in the carburetor, but can also distort the rotors. Backfires should be avoided at all costs. Blower damage due to backfires is not covered by the warranty.

Excessive retardation of the distributor will also cause the engine to run hotter and will contribute to exhaust valve failure. Too much advance will cause detonation, which can damage pistons and valves. Detonation must be avoided at all costs. This range of timing will work best for most applications – the power gain in advancing the timing is not worth the possible engine damage.

The easiest fix for this problem is to utilize a Mercruiser V-6 module, which replaces the V-8 model, which came with your engine. This module will allow you to set the total advance at 28° and still provide 17° of initial timing. This will allow the boat to operate properly under start up and idling conditions.

Another fix is to install an MSD 6M-2 marine ignition module. This is used with the existing ignition system, except the stock V-8 module is removed. This is a widely used arrangement, particularly when higher boost levels of 6 or more psi are being used. For more information on the MSD Marine ignition systems, contact your marine performance dealer or:

MSD Ignition Autotronic Controls Corporation  
1490 Henry Brennan Dr., El Paso, TX 79836  
(915) 857-5200

**NOTE:** Holley DOES NOT recommend the use of a boost retard device in marine applications. While we offer our own Boost Retard kit, it is intended for use in street vehicles. In a car, the blower is not making any boost most of the time, because it is not under a load. You can set up the distributor for optimum timing without boost, and then retard it in a boost condition with a Boost Retard device. A boat engine is in boost almost all of the time, so there is no advantage to having the basic ignition optimized for a non-boost condition. It's much better to optimize your ignition system for boost conditions and under these circumstances, there is no need for a Boost Retard device in a marine application.

### CARBURETION

Necessary carburetor modifications are minimal with the Weiland blower. The installation of a blower increases the distance from the carburetor to the cylinder, which makes a larger volume accelerator pump necessary. If you are using a Holley carburetor, the 50cc accelerator pump kit (Holley PN 20-11) works well. A richer mixture is always desirable on a blown engine to control detonation. The mixture of the secondary side of the carburetor and the WOT or power valve mixture are the more important. Late model "emission" carburetors tend to be jetted much leaner than non-emission or "universal" carburetors. These carburetors need larger jets on both the primary and secondary sides.

We have run tests with all makes of four-barrel carburetors on supercharged engines and gotten good results with all of them. OEM carburetors will work well on engines that are used in the low and mid speed range. These carburetors usually have a lower air flow capacity than is needed for high engine speed running or for boost of over 7 psi. If a new carburetor is being purchased for a supercharger, we would recommend a Holley carburetor, mainly because of the wide range of sizes available and the easy availability of jetting and other parts for these carburetors. Detailed information of the operation and tuning of Holley carburetors is available in the book "Holley Carburetors and Manifolds" by Mike Ulrich and Bill Fisher published by H. P. Publishing.

The rated flow capacity of a carburetor is a way of measuring carburetor size. It is the quantity of air flow through the carburetor that gives a specified pressure drop across the carburetor: usually 1.5 inches of mercury for four barrel carburetors and 3.0 inches of mercury for two barrel carburetors: the higher the flow rating, the bigger the carburetor. Or, the bigger the carburetor, the lower the pressure drop across it at any given air flow. A carburetor can flow more air than its rated capacity, but when it does so, it has a greater pressure drop across the carburetor. The pressure drop through the carburetor reduces the pressure into the supercharger and also reduces the boost pressure in the intake manifold. Therefore, the bigger the carburetor, the higher the blower boost and the higher the maximum power. The problem with this is at the other end of the air flow range. Too big of a carburetor will have low air velocity through the carburetor at idle and in low-speed driving and will give poor driveability. The required air flow capacity for a carburetor on a supercharged engine depends on the displacement of the engine and the boost pressure desired. For single carburetor installations with boost in the 5-7 psi range, we recommend that you consider the following carburetor flow capacities:



Engine Displacement	Carburetor Capacity
300 CID	650 CFM
350 CID	750 CFM
400 CID	850 CFM
450 CID	850 CFM

Use the available carburetor size that is closest to what is recommended for your engine size. The carburetor capacities are for 5-7 psi boost. For higher boost levels (10-12 psi), the carburetor capacity should be about 15% larger. We strongly recommend vacuum secondary carburetors for street use, since they provide better low and mid speed driveability than mechanical secondary or "double pumper" carburetors. Holley offers a 950 CFM carburetor for higher boost applications. This carburetor is good for higher revving big block engines and high-boost 350 CID engines. If you need more than 850 CFM, the best choice is the Holley 1050 CFM or 1150 CFM Dominator carburetors. These are basically race-only type carburetors and do not have good driveability on the street. The Dominator requires an adapter plate, since it has a unique bolt pattern. Holley also offers supercharger-calibrated carburetors, available from 600 CFM to 1150 CFM.

If you are using two carburetors on a 250 Powercharger, we recommend that you use two 750 CFM vacuum secondary carburetors for 350 cid engines and two 750 CFM double pumper carburetors for engines up to 460 cid. For larger engines, two 850 CFM carburetors should be used. For very high output engines, two 1050 CFM or 1150 CFM Dominator carburetors can be used. These carburetors require special adapters and are basically race-only carburetors with poor low speed performance.

The two carburetor mounting pads are tapped, so that the two carburetors can be mounted either fore and aft or sideways.

Because the height of the carburetor is raised when the Weiand supercharger is installed, the stock air cleaner may not be reusable, or you may wish to install an aftermarket air cleaner. In either case, when selecting an air cleaner, make sure it has provision for the PCV inlet and has as large a filtering area as possible. In this case, more is better. Be careful to allow enough room for the choke on the carburetor to operate, without hitting the air cleaner.

#### MAINTENANCE

The Weiand Pro-Street Powercharger is designed for long trouble-free service. The only area that should be checked regularly is the oil level in the gear case. The oil level should be checked every 1,000 miles. If it is below the level of the check hole, SAE 80/90 gear oil should be added.

At the same time the oil is checked, the drive belt should be examined. Poly-V belts should be replaced, if it shows signs of excessive wear on the inside surface or if it is slipping excessively. In normal use, the belt should last a minimum of 20,000 miles. You can detect excessive slippage by the black-powdered rubber collecting on top of the idler assembly. Gilmer belts should be replaced, if they show signs of excessive wear. In normal use, a Gilmer belt should last a minimum of 25,000 miles. Be sure to check the Gilmer belt tension. There must be a minimum of 1/2-5/8" slack in the belt when the engine is hot, or the blower or crankshaft can be over stressed.

#### TECHNICAL QUESTIONS

During the development of the Weiand Pro-Street, we encountered a variety of popular misconceptions and questions related to roots-type superchargers. Most of the questions arise as a result of lack of familiarity with supercharging in general. The questions answered here apply to most supercharger systems, not just the Weiand unit. Below are some of the most asked questions and some answers.

**What is the difference between a roots-type supercharger and a centrifugal-type supercharger?** A roots (or positive displacement) type supercharger pumps the same quantity of air fuel mixture to the intake manifold for each revolution of the blower

at any speed. This gives the same theoretical boost pressure at any engine speed. In actual practice this is not quite true. There is internal leakage in the blower, due to the clearances between the rotors and the housing. This results in less boost, below 2,500 engine rpm, but relatively constant boost pressure at higher speed. A centrifugal blower, on the other hand, generates boost by speeding up the air and forcing it into the intake manifold, similar to a turbocharger. The quantity of air it moves depends on the speed that the blower is running. The boost pressure increases with engine speed. This results in much less boost at lower speeds.

If both a roots blower and a centrifugal blower are set up to give 10 psi of boost at 6,000 engine rpm, the roots blower will have about 10 psi boost between 2,500 and 6,000 engine rpm with the boost dropping off below 2,500 rpm. The centrifugal blower will have 10 psi boost at 6,000 engine rpm, about 7 psi boost at 5,000 rpm, 4 psi at 4,000 rpm and 2.5 psi boost at 3,000 rpm. Since the increase in engine torque over the unblown engine is relative to the boost, the roots blown engine will have a major advantage in torque and acceleration between 2,000 and 5,000 rpm.

**When does the Weiand supercharger produce boost?** The boost pressures mentioned above are the wide-open throttle boost numbers. If the throttle is less than wide-open, there will be less boost or even a vacuum in the intake manifold. When cruising at 60 mph, there will be 10-15 inches of vacuum in the intake manifold, the same vacuum that the vehicle would have without a blower. To get the desired boost from the blower, the throttle must be wide open.

**How much boost will I get?** The wide-open throttle boost of a roots blower will depend on the displacement of the engine, the displacement of the blower, and the drive ratio of the blower. Changing the blower driven pulley (the upper pulley) changes the drive ratio and therefore changes the boost. Other factors, such as camshaft timing, valve size, and port size will also change the wide-open throttle boost. Check with the Weiand supercharger catalog or technical service to get the specific boost level you need.

**NOTE:** The equation for figuring boost with a certain size blower on a certain size engine, and different pulley combinations are as follows:

$$(25.58) \times (\text{Blower Displacement}) \times (\text{Blower Drive Ratio}) \mid \text{Engine Cubic Inch Displacement} - 14.7 = \text{Boost}$$

**EXAMPLE:** 350 cu. In. with a 144 blower and 1.95 - 1 drive  
 $25.58 \times 144 \times 1.95 \mid 350 = 20.52 - 14.7 = 5.82 \text{ psi of boost}$

**BLOWER DISPLACEMENTS** (cubic inch displacement for one revolution of rotors)

142 = 142
144 = 144
174 = 174
177 = 177
250 = 250
256 = 256

#### BLOWER DRIVE RATIO

Divide the lower pulley diameter by the top pulley diameter (serpentine style).

Divide the lower pulley tooth count by the top pulley tooth count (Gilmer style).

*This should be all the information you need to figure boost. Keep in mind that these are generic figures, because there are too many variables when you include barometric pressure, humidity, air temperature, and engine configuration. There is no way to take these factors into account with an equation.*

**What maintenance will the Weiand blower require?** Very little. Check the oil level in the gear case reservoir at 1,000 mile intervals. Change the oil every 7,500 miles. Check the belt condition at the same time. Belt life should be at least 20-40,000 miles

**Will the supercharger give me better mileage?** No. While the supercharger, under normal driving conditions, has proven to be no real detriment to gas mileage, you should not expect any improvement. Because a supercharger, under full throttle conditions, makes a small engine perform as a larger one might, the more you use full throttle, the more your gas mileage will suffer. We have found that for a typical street-driven car, the fuel mileage will decrease by about 4% once the novelty of the supercharger has worn off.

**Should I use a different heat range spark plug when running the Weiand blower?** Usually a one or two step colder plug is beneficial. Too high a heat range can lead to pre-ignition under boost conditions.

**What ignition timing works best?** This will vary, depending on the boost pressure, compression ratio, and fuel octane level. We have found, for a good starting point, that good results are achieved with 16° of initial lead with a total lead of 32 to 35°. Excessive lead will not produce appreciably better performance and will potentially be harmful. Also, having the timing come in too soon may cause detonation. The full advance should be in no sooner than 2,000 rpm and no later than 2,800 rpm.

**Why do my exhaust pipes run red hot?** This can be caused by either incorrect ignition timing or a lean mixture. Without enough initial advance, the engine will run hot and the exhaust pipes will glow in the dark. Check that your timing is within the ranges listed in the ENGINE COMPONENT RECOMMENDATIONS section.

**What is the major advantage to a Weiand Supercharger?** An instant, responsive, performance increase, without major engine modifications is the major advantage. The Weiand supercharger is complete as shipped. The horsepower per dollar ratio is one of the highest for the aftermarket industry. Tests run show a gain of 40% in peak horsepower just by the addition of the Weiand supercharger. The responsiveness of the vehicle with the supercharger is also very impressive.

**How long will the Weiand supercharger last?** We have seen several superchargers that have run over 100,000 miles with no problems and one that has run 127,000 on a big block Chevy. There are very few parts in the supercharger than can wear out, so you should have many trouble free miles with the Weiand supercharger.

**If the drive belt breaks is the car immobile?** Not at all. Simply drive the car. The blower should spin freely. The car won't have as much power, but it will not be immobile. If for some reason the blower seizes, remove the belt. The car can be driven, due to the leakage around the blower rotors. The car will accelerate slowly, but it will get you home. Belt breakage is extremely rare.

**Why is there no pop off valve on the manifold of Poly-V drive kits?** We do not incorporate a pressure-relief (or pop off) valve in our Powerchargers driven by a Poly-V drive belt. We use a spring-loaded idler on a multiple rib Poly-V belt. Our intake manifold has a small volume. This limits the force of any backfire. If a backfire does happen, the belt slips and no damage occurs. The 250 Powerchargers with a Gilmer belt drive do have a pop off valve on the manifold. A severe backfire may result in damage to the supercharger with either type of belt drive system.

**What kind of fuel should I use?** Always use premium fuel. If available, leaded premium is the best for vehicles that are not restricted to "unleaded fuel only". With a water injection unit, a knock sensor, or a boost retard system slightly lower octane fuel can be used, but should be avoided if possible. When using a blower, especially under heavy load conditions, the higher the fuel's octane, the less chance there is of damaging the engine due to detonation. As the octane rating drops, the need for water injection, spark retarding, or octane-boosting additives increase. High octane is cheap insurance.

**Why do I have a poor idle?** Rough idle or high idle speeds are usually caused by a vacuum leak. It can also be caused by a

radical camshaft, incorrect ignition timing or improperly adjusted carburetor(s).

**What happens if I float the valves on my engine?** Floating the valves on a blown engine can be potentially very serious. A blower is actually putting additional pressure on the underside of the valve head (as much as 30 pounds). It is therefore possible to float the valves at a much lower engine rpm than you would if the engine were unblown. Especially, if the valve springs are a bit weak. Additionally, valve float can produce backfiring. In the event a valve is held open too long with a full charge in the cylinder as well as in the manifold and blower, the resulting explosion can damage the blower. We recommend that you maintain good quality valve springs with adequate (not excessive) tension and secondly that you do not over-rev your engine. We feel that 5,500 rpm is a safe limit for most applications.

**What types of gear lube are acceptable for use in the gear case of the Weiand blower?** Weiand uses SAE 80-90 gear lube in the supercharger. When installing the blower on the manifold, be sure to follow the installation instructions regarding oil level. Synthetic gear oil may also be used.

**Can I run Nitrous Oxide with the Weiand blower?** Yes. The power output will be somewhere in the 60% increase range with both the blower and nitrous. The caution we would like to present here, is that you should be very sure that your engine components are up to the loads of that kind of power. You should, at least, have the engine components described in the high-boost section of these instructions. Also, be sure that you fuel pump and fuel lines are up to par for a nitrous system. The nitrous oxide and extra fuel should be injected before the blower, usually between the carburetor and blower, to help cool the blower.

**Will I be able to run propane with the blower?** We recommend against it. We rely on the cooling effect of the fuel vaporizing as it goes through the blower to cool the blower's internal components. Propane is almost completely vaporized as it leaves the carburetor, and contributes nothing from there on to cool the blower. This means that the blower is more likely to run hot and malfunction. Several customers have reported running the Weiand supercharger successfully with propane, but we have not actually seen one of these installations.

**Why doesn't my boost level come up to the level advertised?** There are a variety of reasons, but most are not directly the fault of the blower. Please see the Low Boost Troubleshooting Guide elsewhere in these instructions.

**Is there any particular camshaft to use with a blower?** Yes, depending on what kind of driving you are going to do. If the majority of your driving is to be done with the engine below 4,000 rpm, then a stock camshaft will work best. If your driving will take you to the 4,000+ rpm range on a regular basis, then you should consider using a camshaft that is specifically designed for use with a blower. Basically, you want a cam with more lift and duration on the exhaust side than on the inlet (about 10° more duration) and lobe centerlines at 112-114°.

Weiand offers a line of street supercharger cams for small and big block Chevrolet engines. The Camshaft (P/N 01006LSK) for the small block Chevrolet is a streetable cam with a reasonable idle, plenty of vacuum, and very good mid and top range power. The Camshaft (02006LSK) for big block Chevrolet has a slightly rough idle, acceptable vacuum for most street applications, and outstanding mid and top range power. Both cams include new springs and lifters.

**Can the camshaft profile make a difference in the amount of indicated boost?** Yes. In our dyno tests, we found that for less than 4,000 rpm, the difference in boost and power is negligible. Above 4,000 rpm, the difference was quite noticeable. In a small block Chevrolet dyno test, the stock cam with the blower produced 12.5 psi boost and 310 horsepower at 6,000 rpm. The same engine produced 7 psi and 410 horsepower at 6,000 rpm with our Camshaft (P/N 01006LSK). The high boost level obtained with the stock cam at high engine speeds is deceptive. The blower forces

more air into the manifold than the short duration cam will let into the cylinder. This causes the high boost level. The air piles up in the intake manifold and gives a high boost pressure. With the longer duration cam, the air can get into the cylinder and produce more power, but the measured boost in the manifold is less.

## LOW BOOST TROUBLESHOOTING GUIDE

### 1. AIR INLET RESTRICTION

- A. **The carburetor is too small.** The power rating of your engine with the addition of a supercharger should increase about 40%, and the carburetor air flow capacity should be increased to match. Suggestions for the proper carburetor usage are given in this manual. Basically, when a blower is used on an engine, the rate at which the engine consumes air is increased by from 30 to 70 percent. This requires a proportionally larger carburetor. Too small a carburetor will not allow sufficient air to enter the supercharger.
- B. **Carburetor throttle blades are not opening fully.** There are a variety of reasons why you may not be getting wide-open throttle of both the primary and secondary throttle blades when the accelerator is pushed to the floor. Make sure the throttle lever is able to open fully, being unrestricted by the transmission kickdown linkage or throttle cable, by improper accelerator cable and/or linkage geometry, or blocked by other accessories. Make sure that the throttle cable or linkage travel matches the travel required by the carburetor. Check to see if the throttle blades interfere with the blower housing. Have someone step on the accelerator pedal and push it all the way to the floor, with the engine off. If the throttle blades do not fully open, correct this condition before proceeding.
- C. **Air inlet restriction.** Some air cleaners and filters can be extremely restrictive, either by inlet size, filter flow capacity, or the design of the air cleaner itself. If there is any doubt, use a larger capacity air cleaner. Always use a new air cleaner element.
- D. **Air inlet restriction test.** If there is any doubt about a restriction anywhere in the air inlet system, a simple test will show whether there is a restriction. Connect a vacuum gauge or the boost vacuum gauge to the bottom of the carburetor (not the intake manifold). Warm the car up and drive it at wide-open throttle through the rpm range up to at least 5000 rpm. Observe (or have a passenger observe) the vacuum under the carburetor. At low engine speeds, under 2500 rpm, with the throttle fully open, the vacuum under the carburetor should be 1 inch of mercury (1" Hg) or less. At higher engine speeds (2500-5000 rpm), the vacuum should be no more than 2.5-3.0" Hg. The vacuum reading should not be above 4" Hg at wide-open throttle under any full throttle conditions. If you show a higher vacuum than this at wide-open throttle, then check the three items above in A, B, and C.

### 2. Engine Condition and Configuration

- A. **Excessive overlap in the camshaft profile.** Too much overlap can be detrimental to the amount of boost that the blower can produce. When the intake and exhaust valves are both open, the air mixture is easily passed in and out of the cylinder, unused, and out of the tailpipe. A high overlap, or "race" profile camshaft can make an appreciable difference in the amount of boost the blower produces. Not only can an incorrect cam profile hurt performance as compared to a stock cam, but also the correct choice of cam can make a marked increase in performance. With the Weiand cam, the boost level may go down, but the power will go up.
- B. **Ring and valve condition.** If the piston rings and the valves are leaking or are in poor condition, the boost may be blowing by the rings into the crankcase or out the tailpipe. Please refer to the engine component and condition recommendation section for suggestions on checking the condition of your engine.
- C. **Gasket leaks.** Gasket leaks should show up as a vacuum leak when running the engine at idle. This is not normally a low boost cause, but if the gasket leak is sufficient, the volume of air lost can make a difference. Blower-to-manifold O-ring and manifold-to-cylinder head gaskets can let the boost escape, if they are not fully tightened. Sealer on these gaskets should eliminate leaks.

### 3. Blower RPM too slow.

**Matching the blower size and drive ratio to the engine size and desired boost is an approximation.** There are other factors that also come into play. Sometimes the most effective method of achieving the advertised boost is to simply run the blower slightly faster than calculated. This holds especially true when the boost is just a couple of pounds short.

### CONCLUSION

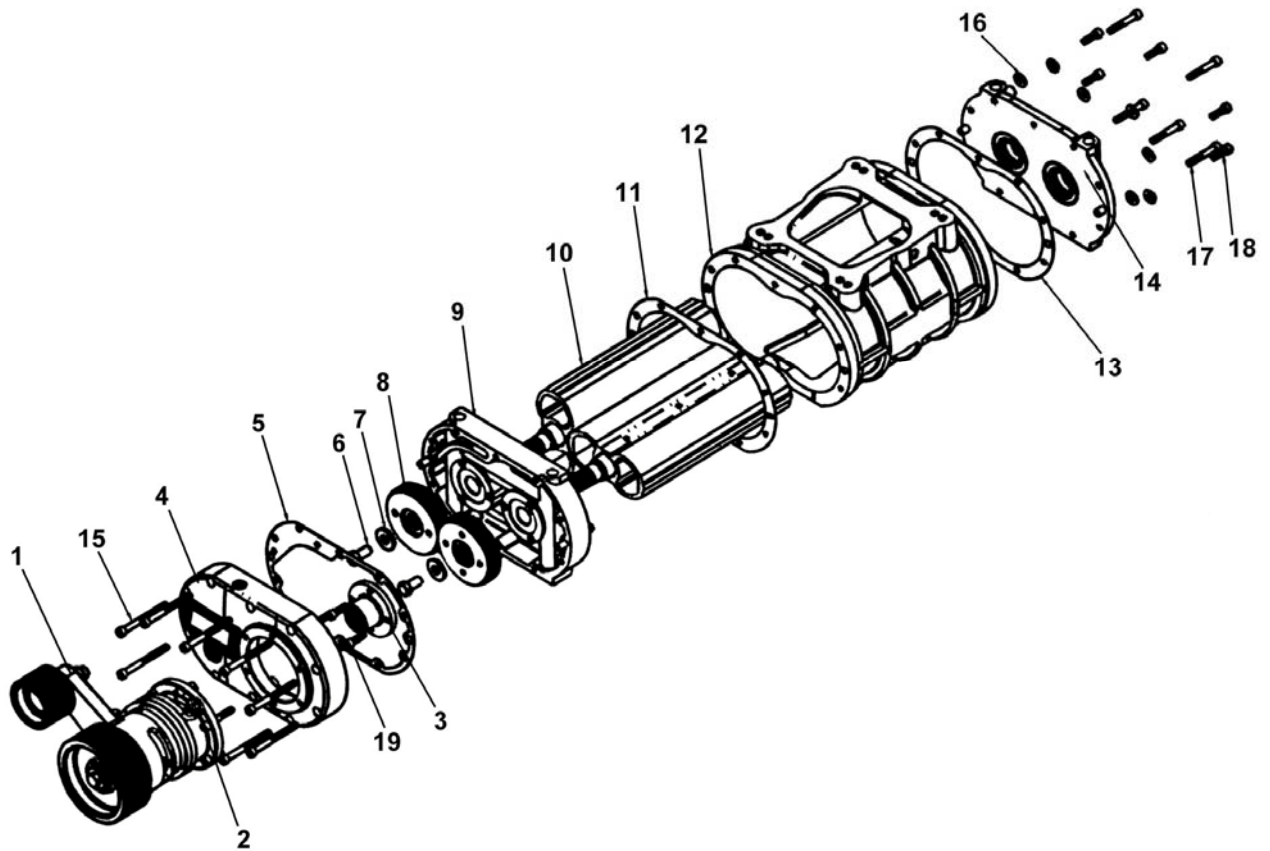
We recommend that you work with an experienced marine supercharger specialist when installing a WEIAND supercharger on your marine application. It is important to remember that marine installations are quite different from installation on street driven vehicles, since a marine engine is typically under boost 100% of the time, whereas a street driven blown engine is usually under boost for very limited periods. The requirements that the supercharger places on a marine engine are therefore quite different and you will find that working with an experienced marine specialist will provide you with a successful installation.

A properly installed and set up WEIAND supercharged engine can provide substantial performance improvements and still deliver a very high level of reliability.

EFFECTIVE COMPRESSION RATIO CHART													
Comp. Ratio	Blower Boost Pressure (lbs. per square inch)												
	2	4	6	8	10	12	14	16	18	20	22	24	26
6.0	6.8	7.6	8.4	9.3	10.1	10.9	11.7	12.5	13.3	14.2	15.0	15.8	16.6
6.5	7.4	8.3	9.2	10.0	10.9	11.8	12.7	13.6	14.5	15.3	16.2	17.1	18.0
7.0	8.0	8.9	9.9	10.8	11.8	12.7	13.7	14.6	15.6	16.5	17.5	18.4	19.4
7.5	8.5	9.5	10.6	11.6	12.6	13.6	14.6	15.7	16.7	17.7	18.7	19.7	20.8
8.0	9.1	10.2	11.3	12.4	13.4	14.5	15.6	16.7	17.8	18.9	20.0	21.1	22.1
8.5	9.7	10.8	12.0	13.1	14.3	15.4	16.6	17.8	18.9	20.1	21.2	22.4	23.5
9.0	10.2	11.4	12.7	13.9	15.1	16.3	17.6	18.8	20.0	21.2	22.5	23.7	24.9
9.5	10.8	12.1	13.4	14.7	16.0	17.3	18.5	19.8	21.1	22.4	23.7	25.0	26.3
10.0	11.4	12.7	14.1	15.4	16.8	18.2	19.5	20.9	22.2	23.6	25.0	26.3	27.7
10.5	11.9	13.4	14.8	16.2	17.6	19.1	20.5	21.9	23.4	24.8	26.2	27.6	29.1
11.0	12.5	14.0	15.5	17.0	18.5	20.0	21.5	23.0	24.5	26.0	27.5	29.0	30.5

The above chart shows the effective compression ratio of your engine, which combines the static compression ratio with the amount of supercharger boost. Note that for most street applications with 92 octane pump gas, you should keep your effective compression ratio below about 12:1. On marine engines, you should keep the effective compression ratio below about 11.5. For added protection against possible engine detonation (knock), we strongly recommend using a boost retard system, such as Holley P/N 91070.

Item	Qty	Description	Torque Spec.	Loctite
(1)	1	Drive Assembly		
(2)	6	Screw—Drive 1/4" -20 x 3/4"	5.5 ft./lbs.	
(3)	1	Drive Coupler		
(4)	1	Gear Case Cover Assembly		
(5)	1	Gear Case Cover Gasket		
(6)	2	Hex Bolt 3/8"-24 x 3/4"	23 ft./lbs.	
(7)	2	Gear 1" DO x 3/8" ID Flat Washer		
(8)	1	Helical Gear Set		
(9)	1	Front Bearing Plate Assembly		
(10)	2	Rotor Shaft Assembly		
(11)	1	Rotor Housing Gasket		
(12)	1	Rotor Housing		
(13)	1	Rotor Housing Gasket		
(14)	1	Rear Bearing Plate Assembly		
(15)	10	Front Cover Screw 1/4"-20 x 2 1/2"	5.5 ft./lbs.	
(16)	10	1/4" Flat AN Washer		
(17)	5	Rear Plate Screw 1/4"-20 x 1 1/2"	5.5 ft./lbs.	
(18)	5	Rear Plate Screw 1/4"-20 x 3/4"	5.5 ft./lbs.	
(19)	4	Hex HD 1/4"-28 x 3/4" GRD 8 Screw		



# AIR SYSTEMS

## Pro-Street Driven Pulleys (Serpentine)

DRIVEN PULLEY DIAMETER (in)	DRIVEN PULLEY P/N (6-RIB)	DRIVEN PULLEY P/N (10-RIB)	DRIVEN PULLEY P/N (16-RIB)	DRIVE PULLEY DIAMETER (in) & RATIO (overdriven)		
				6.00	6.50	7.00
2.50"	90636	90634	-----	2.40:1 (140%)	2.60:1 (160%)	2.80:1 (180%)
2.66"	90534	90541	-----	2.26:1 (126%)	2.44:1 (144%)	2.63:1 (163%)
2.86"	90538	90545	-----	2.10:1 (110%)	2.27:1 (127%)	2.45:1 (145%)
3.05"	6791	6891	6691*	1.97:1 (97%)	2.13:1 (113%)	2.30:1 (130%)
3.23"	6792	6892	6692*	1.86:1 (86%)	2.01:1 (101%)	2.17:1 (117%)
3.48"	6793	6893	6693*	1.72:1 (72%)	1.87:1 (87%)	2.01:1 (101%)
3.73"	6794	-----	6694	1.61:1 (61%)	1.74:1 (74%)	1.88:1 (88%)
3.80"	-----	90639	-----	1.58:1 (58%)	1.71:1 (71%)	1.84:1 (84%)
3.98"	-----	-----	6695	1.51:1 (51%)	1.63:1 (63%)	1.76:1 (76%)
4.10"	90721	90740	-----	1.46:1 (46%)	1.59:1 (59%)	1.71:1 (71%)
4.23"	-----	-----	6696	1.42:1 (42%)	1.54:1 (54%)	1.65:1 (65%)

\*For use with 6" drive pulley—for high-boost applications, use 6.5" drive pulley.

## Lower Drive Pulley

BLOWER SIZE	APPLICATION	6" STANDARD PULLEY PRO-STREET			6.5" HI-PERF. PULLEY PRO-STREET	7" HI-PERF. PULLEY PRO-STREET	
		6-RIB P/N	10-RIB P/N	16-RIB P/N	16-RIB P/N	6-RIB P/N	10-RIB P/N
142	Chevrolet S/B 1986 Only	6714	-----	-----	-----	-----	-----
142 / 144	Chevrolet S/B w/ Long Nose	6710	6810WIN	-----	-----	6713	6813WIN
142	Chevrolet S/B w/ Short Nose	6711	6811WIN	-----	-----	6712	-----
144	Chevrolet / GMC Truck S/B	90592	-----	-----	-----	-----	-----
177	Chevrolet S/B w/ Long Nose	6710	6810WIN	-----	-----	6713	6813WIN
177	Chevrolet S/B w/ Short Nose	6711	6811WIN	-----	-----	6712	-----
174 / 177	Chevrolet B/B w/ Long Nose	6720	-----	-----	-----	6723	6823WIN
177	Chevrolet B/B w/ Short Nose	6721	-----	-----	-----	-----	-----
256	Chevrolet B/B	N/A	-----	6620	6623	-----	-----

**NOTE:** The 250 Big Block Chevrolet will come with a 5.60" 16 RIB P/N 155251.

## Idler Pulleys

Idler Pulley	P/N
6-RIB Idler pulley*	6799
10-RIB Idler pulley*	6899
16-RIB Idler pulley*	6699

\*Includes bearing.

## Serpentine Drive Belts

Application	w/ 6" Drive Pulley			w/ 7" Drive Pulley	
	6-RIB PART#	10-RIB PART#	16-RIB PART#	6-RIB PART#	10-RIB PART#
Chevrolet S/B 142	6700 <sup>1</sup>	6800	-----	6701WIN	6801WIN <sup>3</sup>
Chevrolet S/B 144	6700 <sup>1</sup>	6800	-----	6701WIN	6801WIN <sup>3</sup>
Chevrolet S/B 174	-----	6806WIN <sup>2</sup>	-----	-----	6807WIN
Chevrolet S/B 177	-----	6806WIN <sup>2</sup>	-----	-----	6807WIN
Chevrolet B/B 177 Standard block	6702WIN <sup>1</sup>	6802WIN	-----	6703WIN	6803WIN <sup>3</sup>
Chevrolet B/B 256	-----	-----	6602WIN <sup>4</sup>	-----	-----

<sup>1</sup> Belts listed are for use w/ 3.05" diameter top pulley (included w/ Pro-Street S/B 142 & B/B 177).

<sup>2</sup> Belt listed is for use w/ 3.48" diameter top pulley (included w/ Pro-Street S/B 177).

<sup>3</sup> Belts listed are for use w/ 3.48" diameter top pulley.

<sup>4</sup> Belt listed is for use w/ 4.23" diameter top pulley (included w/ Pro-Street).



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