

CORVAIR

Corvair Monza (1962-64)
Corvair Corsa (1965-66)

DESCRIPTION: This is an exhaust driven supercharger unit consisting of a precision balanced rotating group with a turbine wheel at one end and a centrifugal impeller at the other. Hot gases directed against turbine wheel blades spin the wheel, shaft and impeller at a high rate of speed, causing the compressor impeller to draw air-fuel mixture from carburetor and direct it into intake manifold at a higher-than-atmosphere pressure. The supercharger is provided with a semi-floating sleeve bearing which is lubricated with engine oil taken from the oil filter adapter and drained through a larger tube into rocker arm area of right hand cylinder head.

► **CAUTION:** DO NOT attempt to install a supercharger unit from a special Corvair engine on a standard Corvair engine. The special engine is designed with heavy duty parts for use with a supercharger.

INSPECTION: Each Time Engine is Serviced - Inspect hoses and connections of air intake system between carburetor and supercharger and from supercharger to intake manifold for leakage due to cracks, damaged gaskets, loose clamps or connections and for restrictions due to collapsed hoses or dented tubing. Inspect for exhaust leakage due to cracked exhaust manifold, loose supercharger mounting or damaged gaskets. Inspect oil lines and fittings for kinks, damage or leakage. Check engine exhaust. Excessive smoking may indicate a restricted air cleaner, overrich mixture, or faulty supercharger (seal) operation.

Every 50,000 Miles: NOTE - This inspection should also be made whenever trouble is suspected in supercharger. Disconnect oil drain line at supercharger elbow, then connect a hose from elbow to a separate container at side of engine. Start engine and run at idle speed for one minute to determine oil flow (should be approximately one quart per minute at idle speed). Remove supercharger and carburetor assembly (see below), then remove carburetor from supercharger assembly. Inspect turbine wheel for cracks, erosion, chipped, nicked, missing or bent blades. Check for carbon build-up on blades and for carbon accumulation on back face of turbine wheel. Depress shield plate, back of turbine wheel, against spring ring and rotate turbine wheel. If turbine wheel does not rotate freely, disassemble unit and inspect for damaged parts or foreign material causing interference. Remove compressor housing and gasket and inspect for scoring, wiping, erosion or pit marks on inner contour. Inspect impeller wheel for damaged blades or evidence of rubbing on housing. Check for oil accumulation on impeller or in housing which would indicate a defective oil seal. If necessary to clean impeller, use a nylon bristle brush and diesel fuel or kerosene. CAUTION - Failure to remove all dirt may result in a more severe unbalance than existed prior to cleaning. Check endplay and radial play of turbine shaft (see below). If unit is in good condition, install compressor housing, using a new gasket, and tighten housing bolts to 80 inch lbs.

TURBINE SHAFT ENDPLAY: .005"-.008". To check endplay, attach a dial indicator to bearing housing so that indicator point is contacting impeller nut, then rest supercharger assembly squarely on hub of turbine wheel and push down on housing. Record the indicator

reading, then release pressure on housing and repeat the operation at least once more to check measurement. NOTE - The shield spring acts to return wheel and shaft opposite pressure on housing. It is not necessary to hold shield away from turbine wheel.

TURBINE SHAFT RADIAL PLAY: .022" (maximum). Place supercharger assembly on support ring, Tool J-21004, and position dial indicator so its point is resting on a flat of impeller nut. With indicator needle at zero, push impeller from side to side against indicator point and record the reading. Repeat this operation to check reading. Recheck at 90° position to give a cross reading. If radial play is not within limits, the supercharger should be rebuilt.

TROUBLE SHOOTING: Smoking Exhaust, Loss of Engine Power, Low Boost Pressure - Dirty or undersize air cleaner. Restricted intake manifold or piping. Foreign matter or dirt accumulation on impeller. Interference or binding in rotary assembly. Damaged impeller or turbine wheel. Excessive oil leakage from seals.

Noisy Rotating Assembly: Damaged bearing or other components causing rotating assembly to rub against housing. Foreign matter or carbon accumulation obstructing rotation.

Excessive Vibration: Damaged bearing. Damaged impeller or turbine blades. Restricted induction system.

Excessive Oil in Intake Manifold or Exhaust Stack: Excessive oil leakage from seals.

Supercharger Speed Low, Power Low (Clean Exhaust): Insufficient fuel supply to engine. Leaking intake or exhaust manifold connections. Back pressure on supercharger exhaust too high. Improper accelerator linkage adjustment. Improper ignition timing.

Fails To Return To Idle: Faulty throttle return check valve. Accelerator linkage adjustment.

CARBURETOR: See "Carter YH Carburetors".

SUPERCHARGER OVERHAUL: NOTE - Always cover supercharger openings when working on other parts of engine requiring supercharger openings to be exposed or when unit is stored.

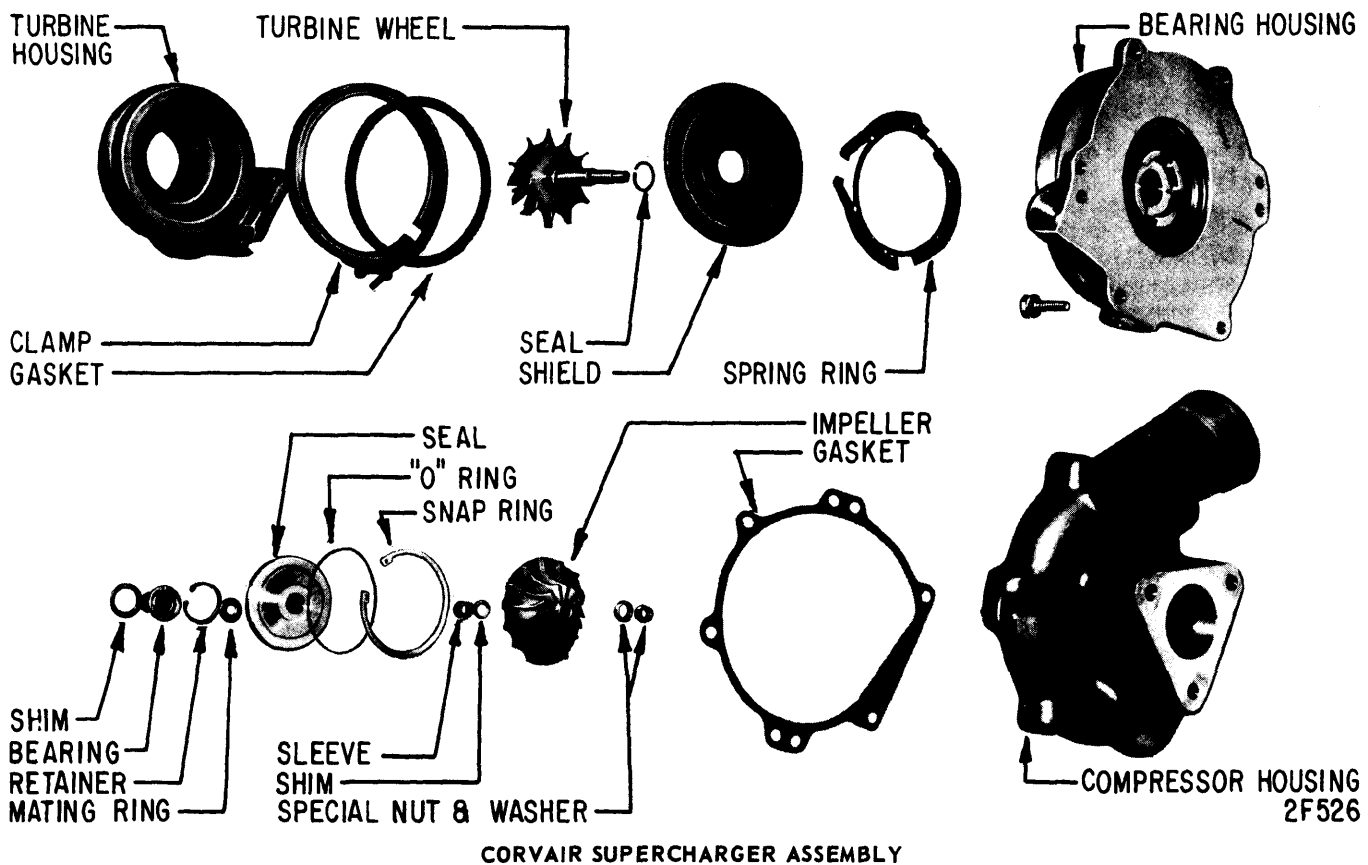
Removal: Remove spare tire, then remove air cleaner assembly and disconnect oil feed line and drain line at supercharger housing. Disconnect accelerator linkage at carburetor. Loosen turbine housing "V" clamp nut, then support supercharger and carburetor; remove clamp and lift assembly out of car carefully to avoid damage to turbine wheel or spillage of gasoline from carburetor. Remove carburetor attaching nuts and remove carburetor from supercharger housing.

Disassembly: NOTE - Disassemble supercharger in a clean, dust-free location, using clean tools and equipment. Avoid contact with dust or grit that could score machined parts. Remove compressor housing from bearing housing, then hold turbine wheel blades with a cloth and remove self-locking nut (Left Hand Threads) from impeller end of turbine shaft, then remove washer. Support supercharger in a press with parallel blocks or support ring, Tool J-21004 so impeller wheel is upward. NOTE - Place a folded cloth on bed of press or inside support ring to avoid damage to turbine wheel as it

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Superchargers

CORVAIR (Continued)



CORVAIR SUPERCHARGER ASSEMBLY

drops out of housing. Place a $\frac{1}{4}$ " diameter brass rod on end of turbine shaft and press turbine shaft from impeller wheel. Remove impeller wheel, shims, shaft sleeve, turbine wheel and shaft assembly, turbine shield and shield spring ring. Remove oil seal retaining ring from bearing housing with snap ring pliers, then turn bearing housing over and push oil seal, "O" ring, and mating ring out of housing with a $\frac{1}{2}$ " diameter rod. Remove bearing retaining ring, bearing and shim.

Cleaning & Inspection: Wash all parts with diesel oil or kerosene, allowing to soak, if required, to remove carbon deposits. Use a nylon bristle brush to remove heavy carbon deposits. **CAUTION - Never use caustic solutions or other cleaner that may attack metal, or a wire brush that could score finished parts.** Inspect each part as follows:

Turbine Housing - Wiping, scoring or pit marks in inner contour. Cracks along dividing tongue, damaged threads in tapered holes or on studs.

Compressor Housing - Wiping, scoring, eroding or pit marks in inner contour and scroll. Damage on gasket surface.

Turbine Wheel & Shaft Assembly - Nicked, bent, broken or missing blades. Cracks at edge of blades. Scoring on back face or back hub. Excessive side wear or carbon build-up in shaft seal groove. Shaft discoloration due to overheating. **NOTE - Normal color of shaft is light tan.**

Impeller - Nicked, broken or missing blades. Evidence of rubbing on blades or back face. Fit of impeller on turbine shaft (impeller must be a press fit).

Bearing Housing - Scoring, heavy wear on bearing bore. Cracked or damaged bearing flange face. Damaged "O" ring seats or snap ring grooves. Thread damage in oil inlets or outlets. A secure bearing roll pin.

Bearing - Scuffing, pit marks or scratches. Imbedded foreign material. Damage to thrust surfaces. Damage on external diameter or shim surface.

Turbine Shield - Check for flatness, scoring, eroding or pitting. Damage to spring ring such as warpage or loss of tension. Check mating ring for scuffing, discoloration or carbon buildup on sealing or thrust surfaces.

Oil Seal Assembly - Chipping, scoring or uneven and excessive wear on carbon face seal insert. "O" ring groove damage. Make sure carbon seal is free floating and has a satisfactory spring tension.

Reassembly: **NOTE - Replace all gaskets "O" ring seal, and damaged or worn parts.**

1) Support bearing housing on ring, Tool J-21004, with flat surface (impeller side) upward, then install a new roll pin in bearing housing (if required) so slot is aligned radially inward.

2) Check shaft-to-bearing play as follows: Place bearing, mating ring and sleeve on turbine shaft. Hold mating ring against shoulder on turbine shaft, then hold bearing up against mating ring and measure clearance between bearing and lower shoulder with a feeler gauge. Record this measurement for later use when determining impeller end clearance. **(Continued)**

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3) Determine bearing-to-housing endplay and select proper shims as follows: Install bearing into housing, lining up roll pin and hole in flange, then install bearing snap ring. Position a dial indicator with point resting on bearing, and set indicator to zero. Push bearing upward against retaining ring and then down to bottom in housing and record the variation (repeat this measurement at least once to be sure of reading). Remove retaining snap ring and bearing and select a shim that will reduce endplay to .001-.002". As an example: If endplay was .015", use one .014" shim to reduce endplay to .001-.002". **NOTE - Shims are available in thicknesses of .008", .009", .010", .011", .012", .014".** The adjusted endplay of bearing-to-housing (.001-.002") plus shaft-to-bearing endplay (see paragraph 2) is total shaft endplay.

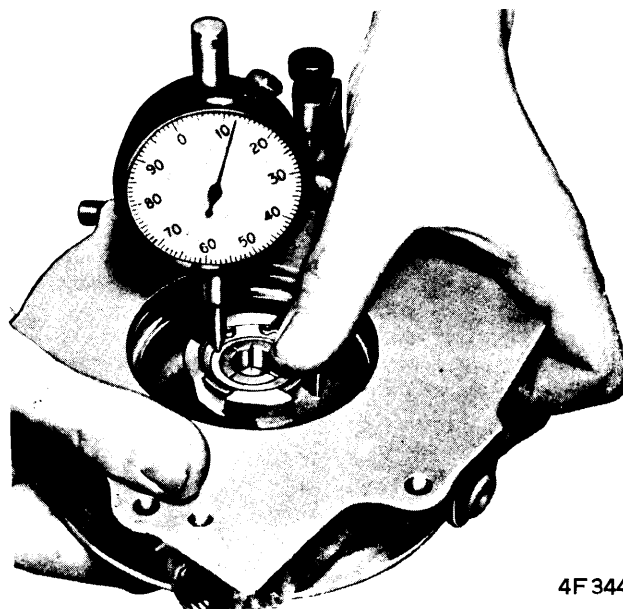
4) Install selected shim, bearing and bearing retainer ring (beveled side upward), then position mating ring so it is centered on bearing flange face. Lubricate "O" ring seal with silicone grease and install in groove of oil seal assembly. Install oil seal assembly into housing by pressing by hand as far as it will go, then install retaining ring (beveled side upward) to hold it in place.

5) Determine impeller shims requirements (for impeller-to-housing clearance) as follows: Place shaft sleeve in center of oil seal assembly, then place the impeller over seal so its center hub rests on shaft sleeve. Install gasket and compressor housing in position on bearing housing and install every other bolt. Tighten to 80 inch lbs. Position a dial indicator with point contacting impeller hub and set indicator at zero. Use long nose pliers to hold hub of impeller and lift straight up on impeller as far as it will go, then record indicator reading. Repeat this operation to check reading. Subtract total shaft endplay (paragraph 3) from the indicator reading just recorded and select shims to reduce impeller clearance to .015-.020". As an example: If impeller movement indicated a clearance of .037", subtract total shaft endplay (.005" as an example); leaving an indicated clearance of .032". Shim thickness must be between .012" and .017" to provide a maximum clearance of .015-.020". **NOTE - Shims are available in thicknesses of .010" and .015".**

6) Remove compressor housing, gasket, impeller and shaft sleeve from bearing housing, then turn bearing housing over (on ring support tool) and install spring ring. Position turbine shield to install with three projections spaced over flat areas of spring ring. Lubricate turbine shaft seal ring groove with oil and install ring into groove. Compress ring into groove using a tag wire or a plastic compression ring. **NOTE - If tag wire is used, make one twist with pliers and bend wire to form it around curvature of shaft and back face of turbine wheel. Remember direction of twist in wire for easy removal.**

7) Lubricate bearing area of shaft and install shaft through bearing. **NOTE - If a plastic compression ring was used, leave it on shaft as it will burn away after installation. If tag wire was used to compress ring, remove wire by a reverse twist and slide it out from between shield and wheel. Hold wheel so it will not slide out past ring.**

8) Hold turbine wheel tightly against shield (so seal ring will not fall out of seal area), then turn assembly over and place in a press so turbine wheel hub rests on press plate. Install shaft sleeve, impeller shim (as determined in paragraph 5), and start impeller on turbine shaft. Press impeller onto shaft, using a hollow spacer, until it bottoms. **NOTE - As an alternate method of installation, the impeller may be heated to a temperature of not more than 300°F and installed onto shaft by hand, without the need of a press.** Remove assembly from press and position special impeller washer with dished head upward and install self-locking nut (left hand threads) on shaft. Hold turbine wheel with a folded cloth and tighten nut to 80 inch lbs.



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BEARING-TO-HOUSING ENDPLAY CHECK

9) Place gasket and compressor housing on bearing housing, secure with six bolts and tighten to 80 inch lbs. Remove holding tool from oil drain opening, then with assembly in approximate installed position, add oil into oil inlet until it flows from drain opening. Install holding tool and install carburetor. **NOTE - If supercharger is not going to be installed immediately, cover all openings to prevent damage or entrance of foreign matter.**

10) If it is necessary to replace turbine housing (attached to exhaust pipe flange), disconnect inlet and outlet flanges, then loosen muffler mounting strap so turbine outlet pipe can be wobbled. Slide turbine outlet pipe flange from turbine by wobbling as needed, then remove from inlet pipe flange. Remove choke heat tubes from inlet flange on housing and install them in new housing flange. To reinstall turbine housing, reverse removal procedure and tighten stud nuts to 80 inch lbs.

Installation: Reverse removal procedure and tighten clamp nut to 30-40 inch lbs.