

Separate shaft and wheel assembly (21) from the bearing housing. **Care must be taken not to damage the compressor wheel or the shaft.**

Remove the bearing (14). Renew the bearing when re-assembling.

Separate the backplate (18) and gasket (20), if fitted, from the bearing housing. Where a gasket is fitted it must be renewed when re-assembling.

Remove the piston ring (19) from the shaft and wheel assembly. The piston ring must be renewed on re-assembly.

Do not remove the pins in the bearing housing.

Cleaning

Before cleaning, inspect all parts for signs of rubbing, burning or other damage.

Clean all parts in clean non-caustic carbon solvent. After soaking, use a stiff bristle brush to remove all dirt particles. Oil and air passages must be clean and free from obstructions.

Blow dry with clean jet of compressed dry air.

Following the cleaning, the parts should be examined and, if found to be in satisfactory condition, re-assembled in the reverse order of the stripping sequence.

Parts Inspection

It is suggested that all parts to be re-used should be checked and measured after the parts have been thoroughly cleaned.

A. Bearing Housing and Groove Pin Assembly

1. Inspect for cracks or fractures, pitting of the gasket (from corrosion or hot gas corrosion) and other machined surfaces, or distortion of turbine end flange. Renew the parts if condition is excessive.
2. Visually check the bearing bore for surface cracks. Renew if bore condition is sub-standard.

Reference maximum bore diameters are:

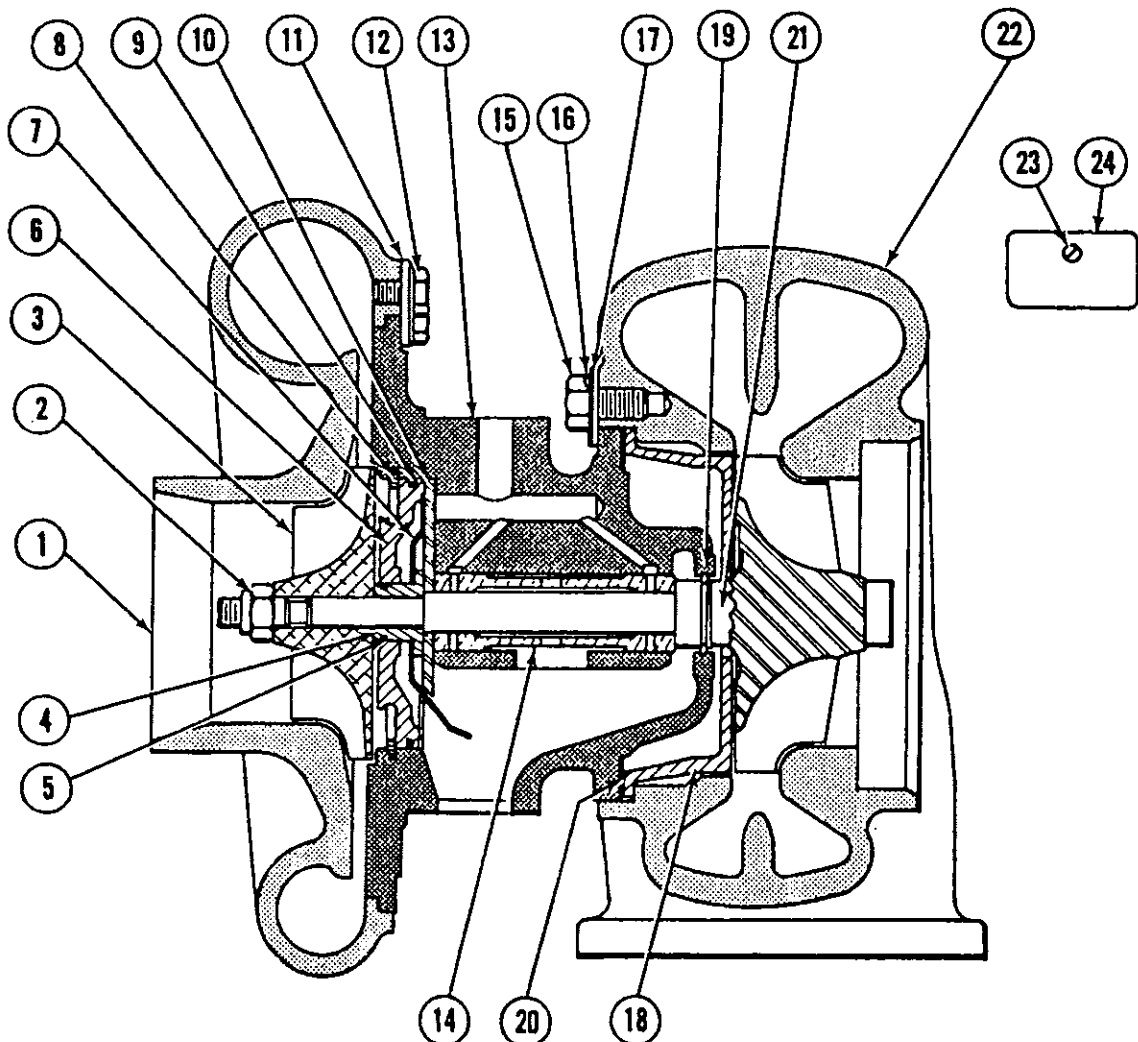
Standard	- 0.7505in (19,06mm)
.010 Oversize rebuilt	- 0.7605in (19,32mm)
.020 Oversize rebuilt	- 0.7705in (19,57mm)

Note: The bore diameter of a rebuilt turbocharger is coded by the last digit of the serial number.

Standard	- 9
010 Over	- 0
020 Over	- 8

B. Compressor Wheel

1. Inspect for evidence of bent, burred or eroded vanes and wear marks on the back. Renew if damaged. **Do not attempt to straighten bent vanes.**



Q.4

C. Turbine Wheel and Shaft Assembly

1. Inspect the wheel for evidence of bent, burred or eroded vanes and wear marks on the back face. Renew if damaged. **Do not attempt to straighten bent vanes.**
2. Check the hub for marks (from high speed contact with the bearing housing bore) and for damage of the seal ring groove. Renew if damaged or wear is excessive.
3. Inspect the bearing journals for evidence of any damage or wear. Renew the journal if necessary.
Minimum journal diameter 0.440in (11,18mm).
4. Measure the concentricity between the large and small shaft diameters with a dial indicator and vee block. Limit of eccentricity is 0.0006in (0,015mm) T.I.R. Renew if not within limit.

D. Compressor Cover

Check for damage from wheel contact, renew if damage is excessive. It is permissible to polish out any small nicks in the cover contour.

E. Turbine Housing and Backplate

Check for damage from wheel contact and evidence of excessive temperature damage to internal flanged surfaces, such as surface cracking and pitting or distortion. Renew if cracked. It is permissible to polish out small nicks in the contour.

F. Small Internal Parts

1. Fit new compressor seal ring in the insert bore. Check for full circle of contact and measure ring gap with feeler gauge. Gap range 0.002/0.007in (0,05/0,18mm). Renew insert if ring fit is out of the limit.
2. Inspect the thrust sleeve for evidence of wear and scratches. Renew if damage is excessive.

Re-assembly

Numbers in parentheses () refer to key numbers in Fig. Q.4.

Check each part before re-assembly. The following items must be renewed when the turbocharger is rebuilt:

Compressor nut (2)	Bearing (14)
Piston ring (5)	Lock plates (16)
"O" ring (9)	Piston ring (19)
Thrust bearing (10)	Gasket (20) – where applicable

Fix the turbine housing (22) securely in vice with the four threaded holes facing upwards.

Oil piston ring (19) and fit in ring groove of shaft and wheel assembly (21), being careful not to over-expand the ring. Position the bearing housing (13) with turbine end up. Fit gasket (20), where applicable, and turbine backplate (18).

The separate backplate has no attachment to the bearing housing, its position is fixed when the bearing housing and the turbine housing are clamped together. A few models do not require a gasket (20).

Oil the piston ring area of the shaft and wheel assembly. Fit into bearing housing using care to avoid damage to piston ring.

Holding the end of the shaft to prevent the shaft wheel from falling out of the bearing housing, place sub-assembly in turbine housing wheel end down.

Oil the bearing (14) and slip bearing down over the shaft into the bearing housing bore.

Oil the thrust faces on both sides of thrust bearing (10). Place thrust bearing bronze side up over shaft and groove pins

engaging pins to holes in thrust bearing. Some models have only one groove pin.

Place oil deflector (7) on thrust sleeve (4).

Oil the piston ring (5) and fit on thrust sleeve using care not to over expand the piston ring.

Oil the "O" ring and fit into groove of insert (6).

Oil the thrust sleeve and fit the small end in hole of the insert from the concave side, taking care not to damage the piston ring.

Oil the thrust cavity in bearing housing and fit insert/oil deflector/thrust sleeve sub-assembly over the shaft into the bearing housing, aligning oil deflector with oil drain cavity in bearing housing. Take care not to damage "O" ring.

Using suitable pliers, fit snap ring (8) into the groove with the flat side against the insert. Ensure the snap ring is securely in position.

Mount a dial indicator on the bearing housing with the stem of the indicator on the end of the shaft. Make sure that the turbine end of the bearing housing is correctly seated in the turbine housing. Move the shaft vertically to determine turbine wheel contour clearance. The clearance must be between 0.018in (0,46mm) and 0.049in (1,24mm). If clearance is not within these tolerances, dismantle unit to determine the cause. Look for burrs, dirt particles or incorrectly assembled parts. If after re-assembly it is still out of the permitted tolerance, do not use.

Install compressor wheel (3) on shaft.

Remove any oil from the shaft threads and apply 2 drops of "Loctite 601" (or equivalent locking agent) to the shaft threads. Using a socket wrench on the turbine wheel lug to prevent the shaft from turning, tighten the compressor nut to 13lbfft (17,6Nm).

Mount the dial indicator on the bearing housing with stem on the end of the shaft, measure the end play. The tolerance is 0.002/0.005in (0,05/0,13mm). **This is a dry (no oil) reading.** If not within tolerance, dismantle and look for burrs, dirt particles or incorrect assembly. Re-assemble and if still out of tolerance, do not use.

Place compressor cover (1) on the bench with wheel cavity upwards. Lubricate the small diameter of the shaft with grease or oil and place the turbocharger core assembly in compressor cover with the turbine wheel up.

Check turbine wheel clearance between back face of the turbine wheel and plate on opposite sides of the shaft. Clearance tolerance must be 0.017/0.049in (0,43/1,24mm). If clearance is not within the limits, dismantle and inspect as with previous components, if on re-assembly still not to tolerance, do not use.

Ensure that the location marks previously made on the compressor cover and bearing housing are in line and fit the four clamp plates (11) with setscrews and locking washer (12). Tighten setscrews to 5lbfft (6,8Nm). Use care not to overtighten screws as damage can be caused to the aluminium compressor cover.

Turn unit over and place in the turbine housing. Apply anti-seize compound to threads and setscrews (15).

Ensure that the location marks previously made on the turbine housing and bearing housing are in line.

Fit clamp plates (17), lock plates (16) and setscrews.

Tighten the setscrews to 12lbfft (16,3Nm) and lock the tabs to setscrews.

Remove completed turbocharger from the vice.

Installation Check List

Inspect the air intake system and the exhaust manifold for cleanliness and foreign matter.

Inspect the oil drain line and make sure it is not clogged.

Inspect the oil supply line for clogging, deterioration or possibility of leaking under pressure.

Inspect the turbocharger mounting pad on the manifold to make certain that all the old gasket has been removed. On some applications an adaptor is fitted between the turbocharger and exhaust manifold assembly. The adaptor is secured to the manifold by four stud nuts and washers and it should be ascertained that all traces of the old gasket have been removed from it.

Install a new gasket between the turbocharger and exhaust manifold. In cases where an adaptor is fitted, it will be necessary to install a gasket between the adaptor and the manifold assembly before placing the turbocharger gasket over the four turbocharger locating studs fitted in the adaptor. Ensuring that the gaskets do not protrude into the openings of the manifold (and adaptor where fitted). The openings in the gaskets should preferably be 0.06 in (1,6 mm) away from the edge of the openings in the manifold and adaptor.

Install turbocharger and tighten mounting bolts or securing nuts.

Connect the oil supply line but leave the oil drain line disconnected.

Connect the compressor inlet and outlet piping. Check all joints for possible leaks. Make certain that the piping is not exerting a strain on the compressor cover.

Connect exhaust pipe.

Motor the engine without firing (i.e. by operating stop control), until a steady flow of oil comes from the oil drain line.

Stop motoring and connect oil drain pipe connection.

Note: When the turbocharger is put into service, it is not advisable to run up to maximum speed or boost during the first 500 miles or 25 hours of running.

SECTION R

Alternator and Starter Motor

