

Series TA04/TA36

Turbocharger Overhaul

Overhaul instructions specific to the series TA04/TA36 turbochargers are given below (Ref. Figure 2.24)

DISASSEMBLY OF TH04/TA36 TURBOCHARGERS:

- A. Clean the exterior of the turbocharger with cleaning solvent to remove accumulated surface matter. Use mineral spirits or other health friendly solvents for initial clean up.
- B. Note orientation of the compressor housing (4) to the backplate (15) and center housing (23) to facilitate reassembly. Do the same for the turbine housing (8) to center housing relationship.
- C. Compressor housing to backplate removal: Bend down the tabs on the lockplates (2) if used, and remove the bolts (1), lockplates, and clamps (3). Discard lockplates and bolts.
- D. Remove the compressor housing (4). If necessary, tap it lightly with a non-marring hammer to free the housing.



CAUTION: Exercise extreme care to avoid contact damage to the compressor wheel when removing compressor housing from the assembly.

- E. Turbine housing to center housing removal: Bend down the tabs of the lockplates (6) and remove the bolts (5), lockplates, and clamps (7). Discard lockplates and bolts. *Clamps may be reused if in serviceable condition (no severe corrosion or elongated holes).*



CAUTION: When removing the housing, be careful not to hit the turbine wheel assembly blades.

- F. Remove the turbine housing (8). If necessary, tap it lightly with a non-marring hammer to free it. *Some housings may need replacing at overhaul, see Table 2.6, page 2-270-01.*
- G. Position the center housing and rotating assembly (CHRA) vertically by securing the turbine wheel hub serrations with a suitable wrench and clamping in a vise, or by engaging the wheel blades in a holding fixture as shown in Figure 2.21.



The nut used on turbochargers part number 466011-2/46C19836 has a left-hand thread. Turn clockwise to loosen.

- H. Using a T-handle wrench such as shown in Figure 2.23, remove the locknut. Discard locknut.



CAUTION: Use only the special wrench described to avoid damaging the turbine wheel assembly.

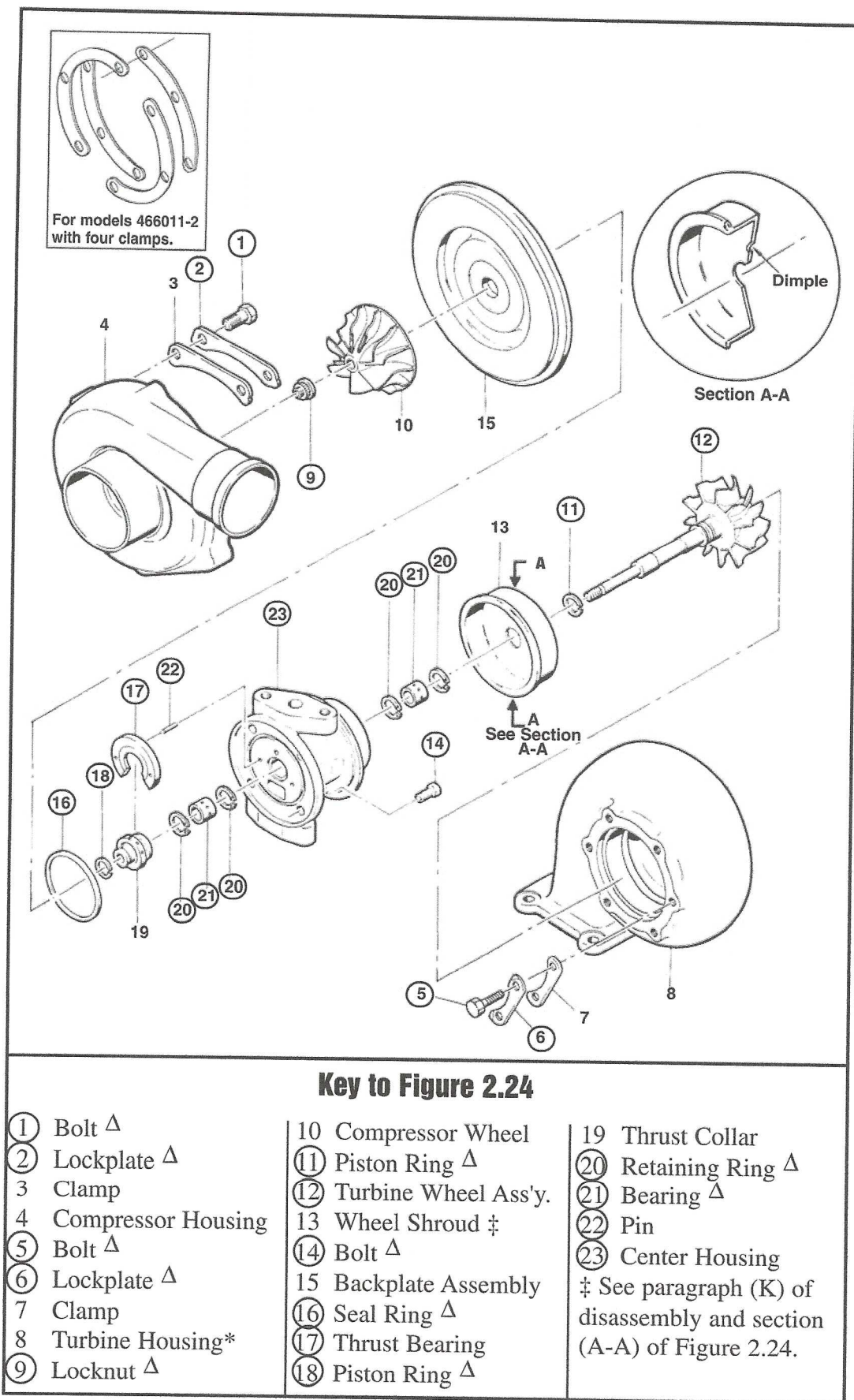
- I. Remove the compressor wheel (10) from the turbine wheel and center housing assembly. If necessary, place the assembly in an arbor press capturing the outer edge of the center housing and press the turbine wheel shaft out of the compressor wheel.
- J. Remove the turbine wheel assembly from the CHRA and discard. *If repair only, separate the piston ring (11) from the shaft. Discard the piston ring, retain the turbine wheel.*
- K. Remove the wheel shroud (13). The current shroud (part number 410952) has a dimple 3/4 inch from the outer edge, as shown in Figure 2.24. Discard and replace any earlier shrouds. *Wheel Shroud must meet Table 2.9 Tolerances on page 2-390-01.*
- L. Remove the bolts (14) and backplate assembly (15). If necessary, tap the backplate with a non-marring hammer to free it. Do not remove the dished spring pressed into the backplate. If the dished spring is loose or free, replace the backplate assembly. Discard bolts.
- M. Remove the seal ring (16) and discard. Lift the thrust collar (19) and thrust bearing (17) off the center housing groove pins (22), then separate the bearing and piston ring (18) from the collar and discard bearing and piston ring.
- N. Remove the retaining rings (20) and bearings (21) and discard.
- O. Discard center housing and groove pins.

CLEANING:

Clean the disassembled parts according to "General Cleaning Instructions" pages 2-230-01.

**Figure 2.24 – Typical
Series TA04/TA36
Turbochargers.**

NOTE: Illustration for reference only -- may not resemble actual part. Use index and part number to select part required.



* Some housings may need replacing at overhaul, see Table 2.6, page 2-270-01.

INSPECTION:

Inspect the disassembled and cleaned parts according to the applicable requirements of "General Inspection Instructions". Also, check the parts listed in Table 2.10 for allowable service limits.

**Figure 2.25 –
Series
TA04/TA36
Turbocharger
Service Limit
Locations.**

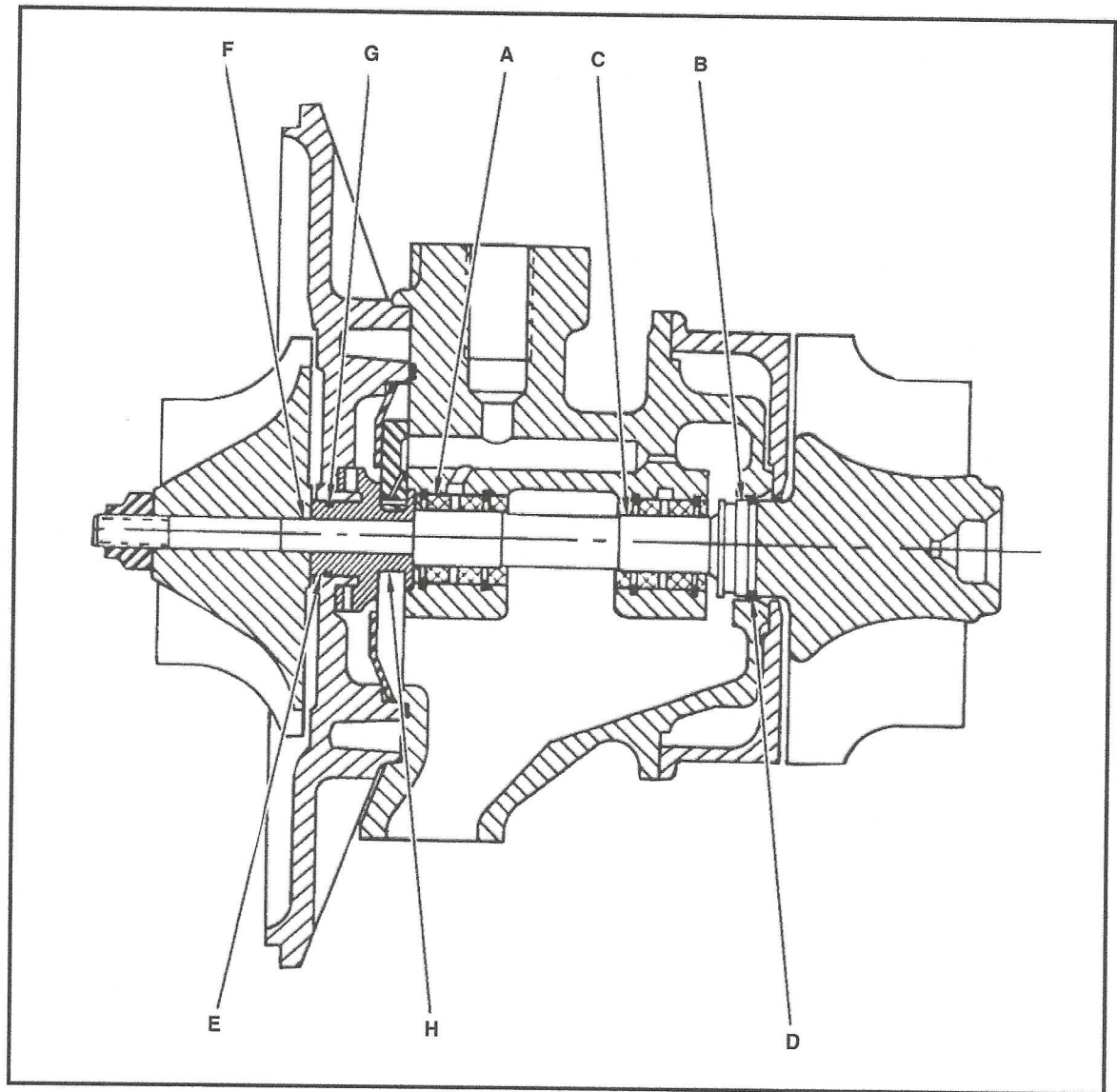


Table 2.10 - Series TA04/TA36 Turbocharger Service Limits

Fig Ref.	Component and Dimension (see Figure 2.25)	Service Limit, in.
A*	Center housing bearing bore ID (maximum)	0.6223
B*	Center housing seal bore ID, standard (maximum)	0.701
B*	Center housing seal bore ID, stepped (maximum)	0.711
B*	Turbine wheel assembly seal hub OD (minimum)	0.679
C*	Turbine wheel assembly journal OD (minimum)	0.3997
D*	Turbine wheel assembly piston ring groove width (maximum)	0.070
E	Backplate seal bore ID (maximum)	0.5005
F **	Compressor wheel bore ID (maximum)	0.2501
G	Thrust collar piston ring groove width (maximum)	0.0653
H	Thrust collar thrust bearing groove width (maximum)	0.1748
H*	Thrust bearing thickness (minimum)	0.1716
A*	Journal bearing OD (minimum)	0.6182
C*	Journal bearing ID (maximum)	0.4014

* **Note:** For reference only. These parts must be discarded and replaced with new at overhaul.

** **Note:** Measure from wheel nut no further down than 2/3 into bore. Measurements in bottom 1/3 of bore not valid.

REPAIR AND REPLACEMENT:

All the parts in Table 2.11 are required replacement at each TA04/TA36 overhaul. Items shown with a delta Δ *must be replaced with new* whenever the turbocharger is disassembled to the extent that these parts are removed. Remaining parts in Table 2.11, if removed may be inspected and if good, reused under repair.

Table 2.11 - Reference For TA04/TA36 Parts Replacement (Refer to Figure 2.24)

Part	Item Number
Lockplate Δ	2, 6
Bolt Δ	1, 5, 14
Compressor Wheel Nut Δ	9
Piston Ring Δ	11, 18
Seal Ring Δ	16
Retaining Ring Δ	20
Journal Bearing Δ	21
Turbine Wheel Assembly	12
Thrust Bearing	17
Pin	22
Center Housing	23



WARNING: COMPRESSOR WHEEL (466011-2 TA0413 ONLY) MUST BE REPLACED AT OVERHAUL. FAILURE TO DO SO MAY RESULT IN EQUIPMENT DAMAGE, INJURY OR DEATH. REPAIR OR REPLACE OTHER PARTS OR ASSEMBLIES AS INSTRUCTED BELOW.





A new or rebuilt replacement CHRA may be installed as an economical alternative.

REASSEMBLY:

Reassembly is the approximate reverse sequence of disassembly. Examine each part before installation for cleanliness, and take care to prevent the entry of foreign matter into the turbocharger.

- A. Lubricate the bearings (21) with clean engine oil. Install the bearings with the retaining rings (20) in the center housing bores with the rounded side of each ring facing the adjacent bearing.
- B. Install the piston ring (11) and wheel shroud (13) on the turbine wheel assembly (12).
- C. Carefully guide the shaft assembly into the bearings on the center housing. Do not force the piston ring into place. Use a gentle rocking/pushing action on the shaft until the piston ring seats.



CAUTION: The piston ring may be easily broken if it is forced into the center housing bore.

- D. Secure the parts with the turbine wheel end down. Either hold the wheel hub serrations in a suitable wrench clamped in a vise, or engage the wheel blades in a holding fixture like the one shown in Figure 2.22.
- E. Install the piston ring (18) on the thrust collar (19) and start the collar on the turbine wheel assembly shaft. Place the thrust bearing (17) on the collar and continue down the shaft to engage the two groove pins (22) on the center housing.
- F. Install the seal ring (16) in the recess in the center housing.
- G. Make sure that the thrust spring (not shown) is installed in the backplate. Start the backplate over the shaft, carefully guiding the thrust collar/piston ring into the backplate bore by starting the ring gap into the bore first.



CAUTION: Do not force the piston ring; it can be easily broken.

- H. Align the bolt holes and secure the backplate to the center housing with the bolts (14). Tighten to 75-90 inch-pounds torque. Apply Torque Seal (Organic Products Co., Irving, TX.) compound or equivalent to the bolts.
- I. With the parts supported as described in step D, place the compressor wheel (10) on the shaft. Make sure that the wheel face and the new locknut (9) are clean and smooth. Lightly oil the locknut threads and the washer face and start the locknut on the shaft.

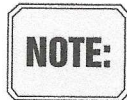


The nut used on turbocharger part number 466011-2 has a left-hand thread. Turn counter clockwise to tighten.



CAUTION: A new locknut must be used whenever a turbocharger is overhauled.

- J. Using a socket wrench with a double universal joint, run the locknut down until it bottoms. Observe and record the drag torque.



Bottoming is indicated by a sharp increase above the noted drag torque.



CAUTION: Bending loads may damage the turbine wheel assembly.

- K. Continue tightening the locknut to a torque value of 18-20 inch-pounds above the drag torque. Remove the socket wrench.
- L. Using a T-handle wrench such as shown in Figure 2.23, stretch the shaft either by tightening the locknut further through an angle of 90°, or as follows:
1. With the T-handle wrench in place, attach a turbocharger indicator set as shown in Figure 2.21. (See page 2-190-01 for tool information.) With the indicator plunger pressed against the end of the shaft, but not in the center hole, preset the dial to read zero.
 2. Tighten the locknut until the shaft increases in length by 0.0055-0.0060 inch, as shown on the indicator dial.
- M. Coat the threads of the bolts (5) with MRO Solution 2000 copper anti-seize (MRO Solutions L.L.C., Niles, IL. - previously Fel-Pro high-temperature compound C5A), or equivalent.

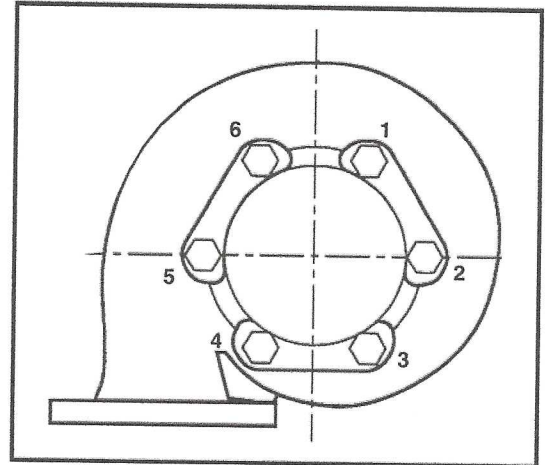
- N. Reassemble the turbine housing (8) and center housing, mate the housings by aligning them as noted in the disassembly process.



CAUTION: Be careful not to hit the turbine wheel blades.

- O. Install the clamps (7) lockplates (6) and bolts (5) as follows:

1. For a turbocharger with part number 465292-1: Install a clamp, lockplate and bolts at locations 1 and 6 shown in Figure 2.26A. Tighten the bolts to 100-130 inch-pounds torque and bend up the lockplate tabs. (The remaining hardware is installed at engine installations.) Proceed with step (Q).
2. For any turbocharger except part number 465292-1: Install the clamps, lockplates and bolts at all locations shown in Figure 2.26A. Tighten as described in step 1. Proceed with step (Q).



**Figure 2.26A – Series TA04/TA36
Turbine Clamp Locations.**



CAUTION: Improper tightening will allow the turbine wheel to rub against the housing, causing damage.

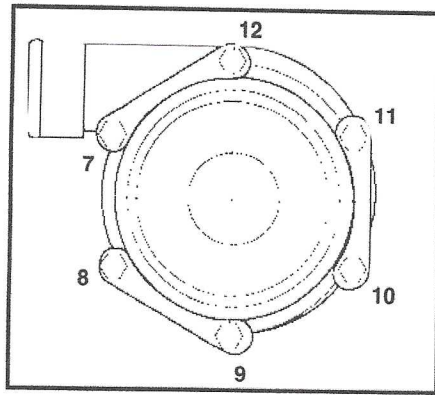
- P. If turbine housing to center housing orientation was not noted during disassembly, then temporarily install the turbine housing with clamps (7), lockplates (6), and bolts (5) at the locations specified in step (O). Tighten the bolts enough to prevent the turbine housing from touching the wheel, but loose enough to allow the housing to be rotated. Do not bend up the lockplates at this time.



CAUTION: It is required that a tag be placed on the housing with clear instruction to the installer that bolts are left loose to allow for alignment at installation. The tag must state that once alignment is achieved, the bolts must be tightened to proper torque and lockplates bent to secure each bolt.

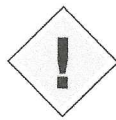
- Q. If disassembly orientation was noted on the compressor housing (4) and backplate (15), position the housing on the backplate as noted:

1. For turbocharger part numbers 466642-1, -2, and -5: Install the six bolts with two clamps at locations indicated in Figure 2.26C. Tighten the bolts to 135-165 inch-pounds torque.



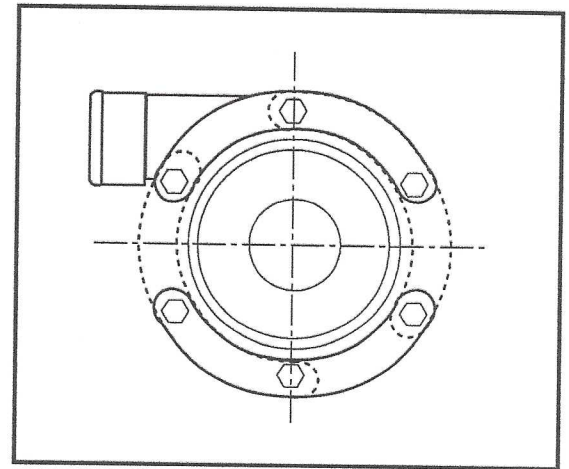
**Figure 2.26B - Compressor
Clamp Locations.**

2. For part number 466011-2: Install the six bolts, four clamps, and two lockplates as shown in Figure 2.26C. Tighten the bolts to 135-165 inch-pounds torque.
3. For typical turbochargers (those not mentioned in steps 1 and 2): Install clamps (3), lockplates (2), and bolts (5) as shown in Figure 2.26B. Tighten the bolts to 100-130 inch-pounds torque and bend up the lockplate tabs except at locations 7 and 12 on part number 465398-2 until customer bracket is installed. Proceed to step (S).



CAUTION: Improper tightening will allow the compressor wheel to rub against the housing, causing damage.

- R. If compressor housing to backplate orientation was not noted during disassembly, then temporarily install the housing with clamps (3), lockplates (2) if used, and bolts (1) at the locations specified in step Q. Tighten the bolts enough to prevent the compressor wheel from touching the housing, but loose enough to allow the housing to be rotated. Do not bend up the lockplates.



**Figure 2.26C - Compressor Clamp
Locations for Typical Models With Two or
Four Clamps (466642-1, -2, and -5)
(466011-2).**



CAUTION: It is required that a tag be placed on the housing with clear instruction to the installer that bolts are left loose to allow for alignment at installation. The tag must state that once alignment is achieved, the bolts must be tightened to proper torque and lockplates bent to secure each bolt.

- S. If the compressor/turbine mounting bolts have been tightened but the housings have not been oriented to the center housing, perform the "Orienting Compressor and Turbine Housings" procedure described on pages 2-100-01.
- T. If the turbocharger is not to be installed immediately, see "Pre-lubricating Turbocharger Not on Engine," pages 2-110-01.

This Page Intentionally Left Blank

Cirrus

Aircraft Application	Engine Model	Turbocharger Part No.	Turbocharger OEM Part No.
SR22 **	IO-550-N w/STC	466304-0003	(400 Series) 646677
SR22T **	TSIO-550-K	466304-0003	646677

Commander:

Aircraft Application	Engine Model	Turbocharger Part No.	Turbocharger OEM Part No.
112TCA 114TC	TO360C1A6D TIO540AG1A	(600 Series)* 466011-9002	(600 Series)* 46C19836
* See 600 series Turbo Charts			

Twin Commander:

Aircraft Application	Engine Model	Turbocharger Part No.	Turbocharger OEM Part No.
685 685 700	GTSIO520F GTSIO520K TIO540R2AD	408590-9002* 408590-9002* 465680-9001	635034-12 635034-12 LW-13897

* Includes bypass valve. To order turbocharger only, use 408590-9012.

Lancair:

Aircraft Application	Engine Model	Turbocharger Part No.	Turbocharger OEM Part No.
Lancair IV & IVP **	TSIO550B (2)	466304-9003	646667
Lancair IV & IVP **	TSIO550E (2)	466304-9003	646667

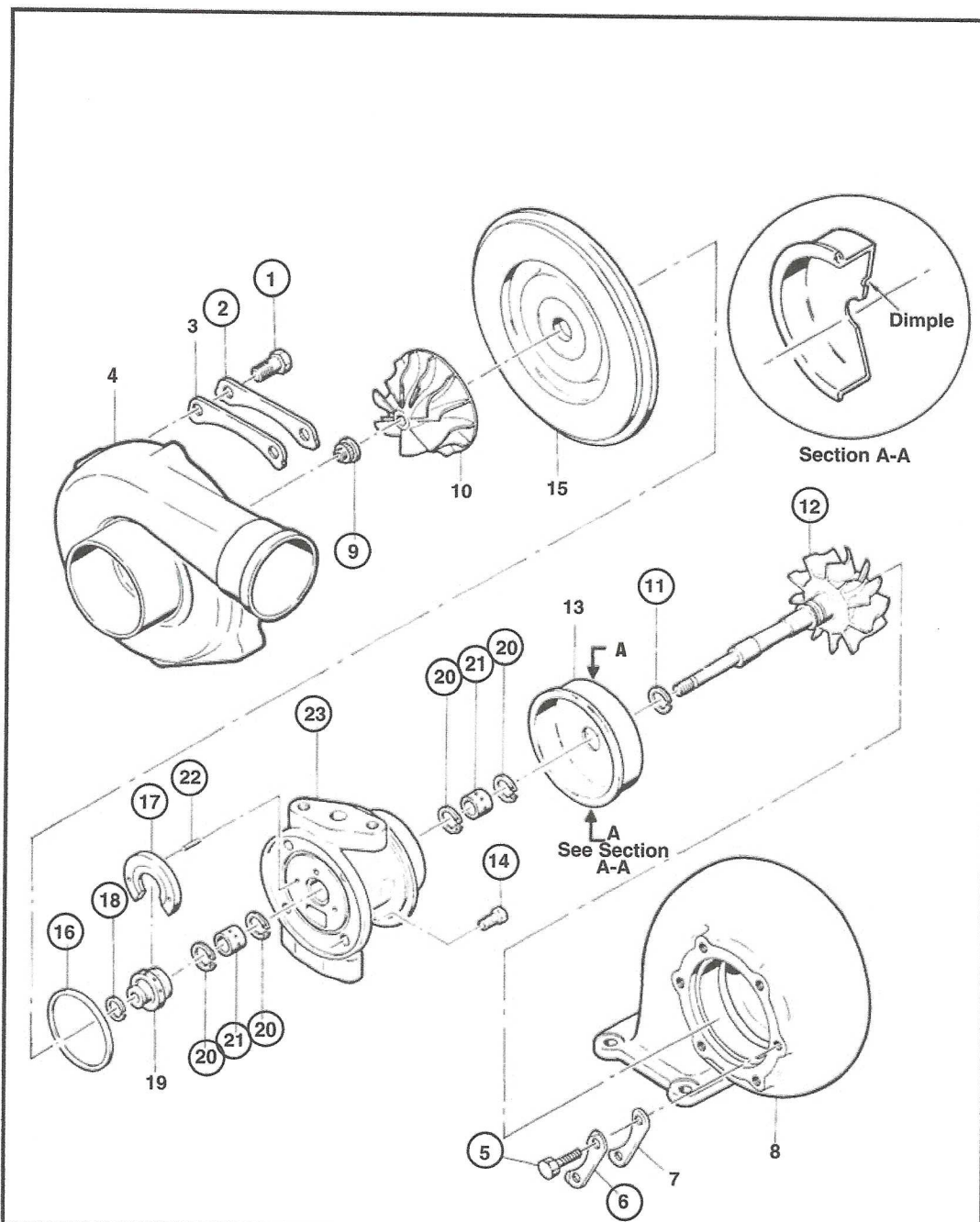
Mooney:

Aircraft Application	Engine Model	Turbocharger Part No.	Turbocharger OEM Part No.
M20K (79 - 81)	TSIO360GB	(600 Series)*	(600 Series)**
M20K (82 & UP)	TSIO360LB,MB	(600 Series)*	(600 Series)**
M22 (67 - 70)	TIO541A1A	406110-9005	LW-11968
M20M (TLS)	TIO540AF1A	466011-9002	46C19836
M20M (TLS Bravo)	TIO540AF1B	466011-9002	46C19836
Mooney Encore	TSIO360SB	466642-9001	649151-1

* See 600 series Turbo Charts ** These Turbochargers are non-PMA'd in aircraft (reference only)

**Figure 5.6 - TA3601
Turbocharger Line
Drawing.**

NOTE: Illustration for reference only -- may not resemble actual part. Use index and part number to select part required.



Key to TA3601 Turbocharger

NOTE: Circled items represent replacement parts required at each overhaul. If marked with Δ , replace with new whenever parts are removed.

- | | | |
|----------------------|------------------------|---------------------------|
| ① Bolt Δ | 10 Compressor Wheel | 19 Thrust Collar |
| ② Lockplate Δ | ⑪ Piston Ring Δ | ⑳ Retaining Ring Δ |
| 3 Clamp | ⑫ Turbine Wheel Assy. | ㉑ Bearing Δ |
| 4 Compressor Housing | 13 Wheel Shroud* | ㉒ Pin |
| ⑤ Bolt Δ | ⑬ Bolt Δ | ㉓ Center Housing |
| ⑥ Lockplate Δ | 15 Backplate Assembly | * See paragraph (K, on |
| 7 Clamp | ⑭ Seal Ring Δ | page 2-440-01) of |
| 8 Turbine Housing | ⑮ Thrust Bearing | disassembly and section |
| ⑨ Locknut Δ | ⑯ Piston Ring Δ | (A-A) of Figure 2.24. |

TURBOCHARGER MODEL TA3601:

Index Number	P/N 466304	Description	Turbocharger Part Number												
			466304-3												
①	400572-301	BOLT; Compressor Housing	6												
②	407876	LOCKPLATE; Compressor Side	3												
3	407875	CLAMP; Compressor Housing	3												
4	408274-23	COMPRESSOR HOUSING	1												
⑤	400573-8	BOLT; 0.500" long, Turbine	4												
⑤	400573-10	BOLT; 0.625" long, Turbine	2												
⑥	406909	PLATE, LOCK; Turbine Side	3												
7	406908-2	CLAMP; Turbine Housing	3												
8	441990-38	TURBINE HOUSING	1												
⑨	400768-11	LOCKNUT	1												
10	409826-11	WHEEL, COMPRESSOR	1												
⑪	408049-9	RING, PISTON (superseded by 408049-2)	1												
⑪	408049-2	RING, PISTON	1												
⑫	410188-25	WHEEL TURBINE; Assembly	1												
13	410952	SHROUD, WHEEL	1												
⑭	400834-202	BOLT; Back Plate	4												
15	408045-34	BACK PLATE; Assembly	1												
⑯	400424	SEAL RING; Cnt. Hsg. To Back Plate	1												
⑰	407634	THRUST BEARING	1												
⑱	403818-9	RING, PISTON; Turbine Seal	1												
19	408792	COLLAR, THRUST	1												
⑳	400568	RETAINING RING	4												
㉑	406902	BEARING; Journal	2												
㉒	400705	PIN, SPRING; Anti-Rotation	2												
㉓	441320-12*	HOUSING, CENTER	1												
	468226-11	CENTER HOUSING KIT (INCLUDES ITEMS 22 AND 23 ABOVE)	1												
	408105-251	CHRA Sub Assembly (INCLUDES ITEMS 9 THRU 23)	1												
		*Item 22, Anti-Rotation Spring Pins must be purchased and installed.													

