Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Akbar Pratama Lembu **No ID:** 1

Validation Date: 27-02-2026 **School:** SMKN 1 SINGOSARI

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student.

Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			Score seal, bearing, gasket course or subject.

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation				
Prepare related literature	✓			Observe if the candidate is referring to the Manufacturer's Literature
Prepare required equipment	✓			Observe if the candidate is preparing bearings, seals, and gaskets
Prepare related tools	✓			Observe if the candidate is preparing related tools (e.g.: Hand tools, bearing puller, Bearing heater, Infrared Thermometer, etc.)
Prepare Safety & Contamination Control equipment	✓			Observe if the candidate is preparing related Safety & CC Equipment (e.g.: PPE, Blue Towel, Plastic Wrap, etc.)

Tasks	Completed			Observatio
	Yes	No	N/A	
Perform etiquette/manner when starting the job				
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			• Perform smile • Introduce Stud
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed			Observation / Hi
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets				
1. Accessing Information	✓			Observe if the candidate is acce information relating task from m literature
2. Bearing, Seals & Gasket Removal	✓			Observe if the candidate is remo seals and gasket following instru manufacturer's literature
3. Determine bearing reusability of bearings, seals, and gasket	✓			Observe if the candidate is inspe seals and gasket following manufacturer's literature
4. Bearing, Seals & Gasket Installation	✓			Observe if the candidate is insta seals and gasket following manufacturer's literature
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.	✓			• Find the improper condition. • Communicate the finding to the customer/assessor.

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting				
All relevant documentation completed correctly and approved by customer (if required).	✓			• Completing the Task List • Completing Measurement Form/Related Check Sheet, if required • Create Service Report (SIMS), if required • Create SPR, if required • Documenting the failed or damaged parts, if required • Provide Technical Analysis Report/Failure Analysis Report, if required.

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using APD related to the job	✓		
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	✓		• Comply with safety regulation that applied on the workplace
State and follow Safety Precautions	✓		• Create Job Safety Analysis • Student must follow safety procedure refer to service manual or SIS related to job
Serviceman completes job without accident due to incorrect procedure using hand tools.	✓		• Correct working position • Correct hand tool related to the job
Tasks completed without damage equipment and tools	✓		

Tasks	Completed		Observation / H
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping	✓		1. Waste is minimized, was including sludge; solids a wastes are sorted and st recycling or disposal 2. Packaging of goods rece and reused or disposed 3. Materials that can be reu cleaned and stored 4. Waste and scrap are rem following workplace proc 5. All fluids are disposed of with enterprise policies a

Tasks	Completed			Observatio
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.	✓			• Perform smile & • Ask permission t the interaction.

Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Akbar Pratama Lembu No ID: 1

Validation Date: 27 - 02 - 2026 School: SMKN 1 SINGOSARI

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student.

Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation				
Prepare related literature	✓			
Prepare required equipment	✓			
Prepare related tools	✓			
Prepare Safety & Contamination Control equipment	✓			

Tasks	Completed			Observation /
	Yes	No	N/A	
Perform etiquette/manner when starting the job				
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets				
1. Accessing Information	✓			
2. Bearing, Seals & Gasket Removal	✓			
3. Determine bearing reusability of bearings, seals, and gasket	✓			
4. Bearing, Seals & Gasket Installation	✓			
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner when starting the job				
Meet the customer / assessor				
Perform etiquette/manner when opening the interaction.				
Explain the purpose of Student's activity.				
Ask permission to perform the job.				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets				
1. Accessing Information				
2. Bearing, Seals & Gasket Removal				
3. Determine bearing reusability of bearings, seals, and gasket				
4. Bearing, Seals & Gasket Installation				
5. Equipment and tooling are used in the correct way				
6. Equipment and tooling are cleaned and returned to its correct location				
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting				
All relevant documentation completed correctly and approved by customer (if required).				

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using APD related to the job			
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)			
State and follow Safety Precautions			
Serviceman completes job without accident due to incorrect procedure using hand tools.			
Tasks completed without damage equipment and tools			

Tasks	Completed		Observation / Hint
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping			

Tasks	Completed			Observation
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting				
All relevant documentation completed correctly and approved by customer (if required).	✓			

Tasks	Completed		Observation / Hints
	Yes	No	
Safety			
Using APD related to the job	✓		
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	✓		
State and follow Safety Precautions	✓		
Serviceman completes job without accident due to incorrect procedure using hand tools.	✓		
Tasks completed without damage equipment and tools	✓		

Tasks	Completed		Observation / Hints
	Yes	No	
Contamination Control			
Environmental Practices & Housekeeping	✓		

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.	✓			

General Comments

RESULT: COMPETENT ☑ NOT YET COMPETENT ☐ (please check (

Student: Akbar Pratama Lembu — Name; 27-02-2026 — Date; Signature

Assessor: Sriawan TB — Name; 14-03-2026 — Date; Signature

Supervisor: Name; Date; Signature

Data Recorded: Name; Date; Signature

General Comments

RESULT: **COMPETENT** ☐ **NOT YET COMPETENT** ☐ (please check (√))

	Name	Date	Signature
Student:			
Assessor:			
Supervisor:			
Data Recorded:			

Demonstrate Inspecting and Servicing Various Bearing, Seal and G Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: _____ **No ID:** _____

Validation Date: _____ **School:** _____

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the
- Removing
- Inspection
- Installing

The student must be able to perform the following task:
- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and report. Literature and measuring tools will be made available but will not be provided directly to the studen

Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hi
The student must complete the knowledge assessment. Minimum passing grade 80%.				

Tasks	Completed			Observation
	Yes	No	N/A	
Preparation				
Prepare related literature				
Prepare required equipment				
Prepare related tools				
Prepare Safety & Contamination Control equipment				

* Thrust Bearing
* Collar Thrust
* Floating Bearing

- Duo cone seal
- ~~Cup and Cone bearing~~
- Tapered roller bearing
- Singel row ball bearing
- sleeve bearing
- ~~Single roller~~ Needle thrust bearing
- gasket
- ~~Bearing block~~ U-packing

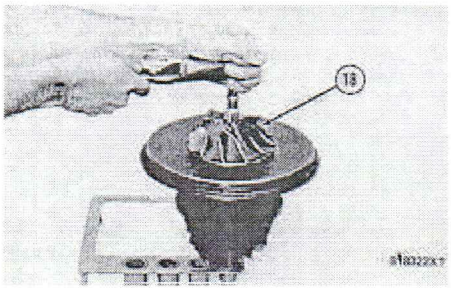
Needle roller bearing

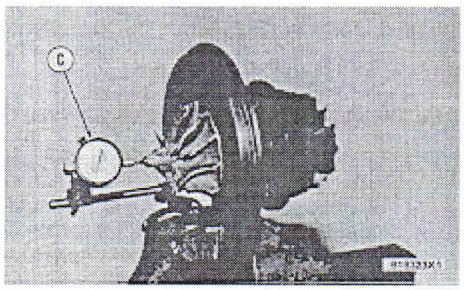
clamp

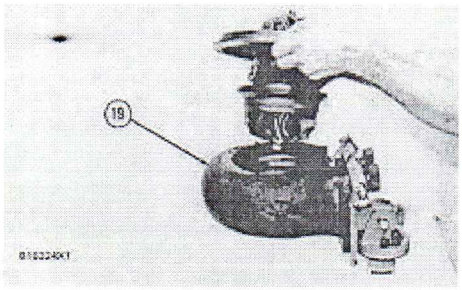
Lip seal

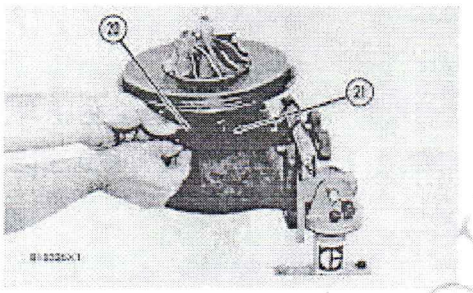
Thrust ball bearing

Deep groove ball bearing









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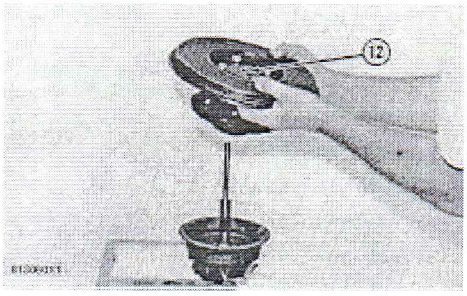


WARNING

CAUTION

Do not put a side force on the turbine shaft when the nut is tightened or bent shaft will be the result.

17. Put a small amount of oil on the turbine shaft threads and the compressor wheel face that will be under the nut. Install the nut and tighten it to a torque of 31 N·m (23 lb ft) to push the compressor wheel (18) on the shaft. Loosen the nut and tighten it again to 5 N·m (4 lb ft). Tighten the nut 120° of a turn more.

18. Put the cartridge housing in a vise as shown. Check the shaft end play with tool group (C). The shaft end play must be 0.165 ± 0.063 mm (.0065 ± .0025 in.).

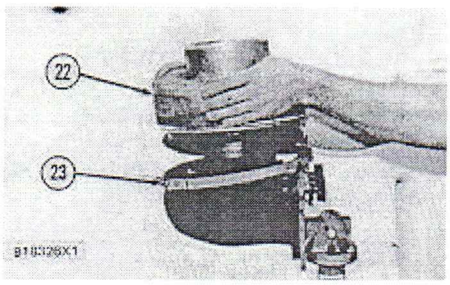
19. Install turbine housing (19) on tool group (D) as shown. Put the cartridge in position in housing (19). Make sure the marks on the housing and cartridge are in alignment.

20. Put 5P3931 Anti-Seize Compound on the threads of the bolts and install the clamps (21), locks (20) and the bolts to hold the cartridge in position. Tighten the bolts 20 ± 2 N·m (177 ± 18 lb.in.) and bend the tabs of the locks on the bolts.

21. Install clamp (23) and compressor housing (22) on the cartridge in the correct position. Move clamp (23) into position and tighten the nut to a torque of 14 ± 1 N·m (10 ± 1 lb.ft.). Lightly hit all around the clamp with a soft faced hammer and again tighten clamp nut to the same torque.

end by:

a) install turbochargers



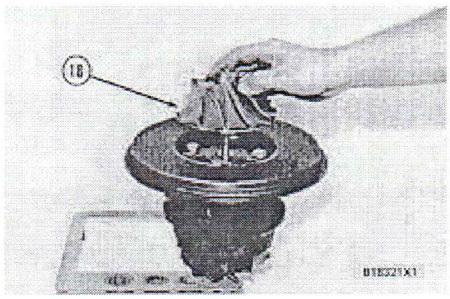
Make sure the spacer fits correctly in the counterbore of the thrust collar.

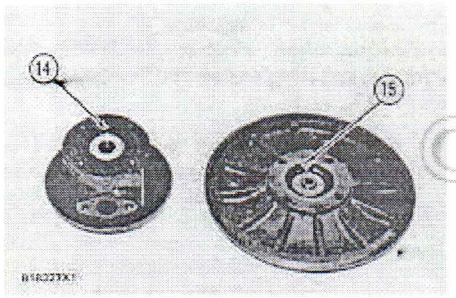
13. Install the locks and bolts to hold backplate assembly (13) to the cartridge housing. Tighten the bolts to a torque of 10 ± 1 N·m (7 ± 1 lb ft) and bend the tabs of the locks on the bolts.

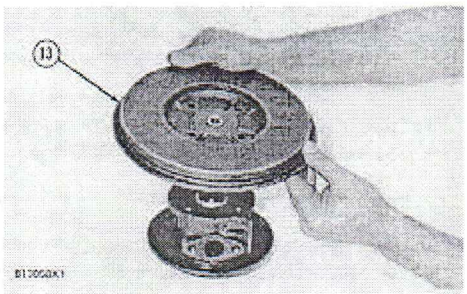
14. Put the turbine shaft in position in tooling (B). Put 6V2055 High Vacuum Grease in the groove for seal ring (16). Make sure the grease fills the groove approximately one half or more of the groove depth for the complete circumference of the groove to help make a carbon dam under the seal ring. Install seal ring (16) and shroud (17) on the turbine shaft.

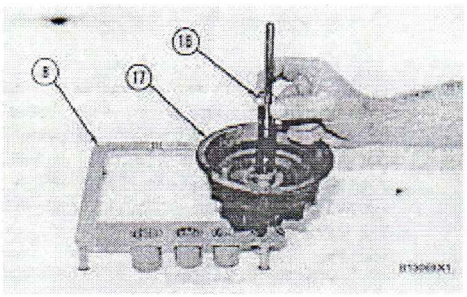
15. Install the cartridge housing on the turbine shaft while spacer (12) is held in position. Make sure the seal ring on the turbine is fitted correctly in the cartridge housing.

16. Put compressor wheel (18) in position on the turbine shaft.









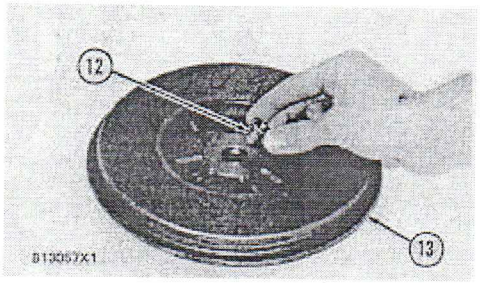
7. Install thrust bearing (8) over the dowels in the cartridge housing. Make sure the grooves in bearing (8) are toward the outside as shown.

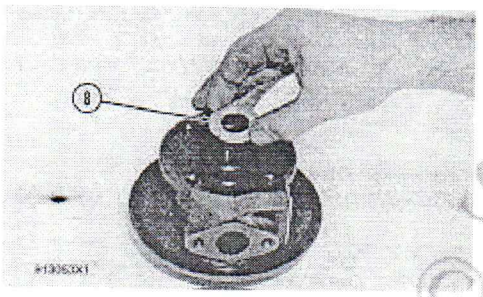
8. Install seal ring (9) in the groove of the cartridge housing.

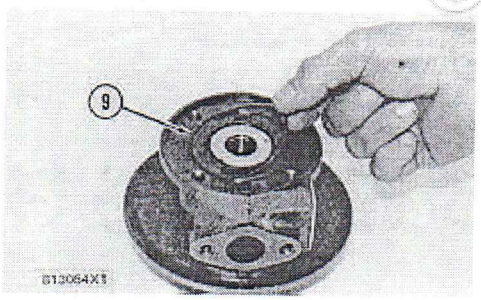
9. Put thrust collar (10) in position on the thrust bearing with the counterbore for the spacer up.

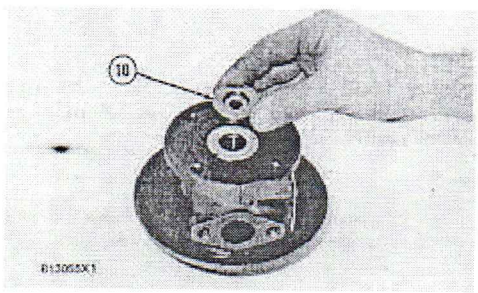
10. Install seal rings (11) on spacer (12) so the gaps in the rings are 180° apart.

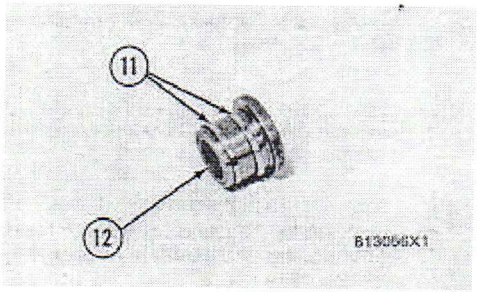
11. Install spacer (12) in backplate assembly (13).











12. Make sure oil passage (14) in the cartridge housing and oil passage (15) in the backplate assembly are in alignment. Put backplate assembly (13) in position on the cartridge housing.

	Tools Needed	A	B	C	D
1P1853	Snap Ring Pliers	1			
9S6343	Fixture Assembly		1		
8S2328	Dial Test Indicator Group			1	
9S6363	Turbocharger Fixture Group				1

1. Make sure that all of the oil passages in the turbocharger cartridge housing, backplate assembly and bearings are clean and free of dirt and foreign material.

2. Put clean engine oil on all parts of the cartridge at assembly.

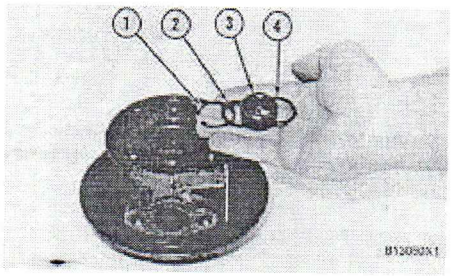
NOTE: Make sure the round edge of the snap rings are toward the bearings when the snap rings are installed.

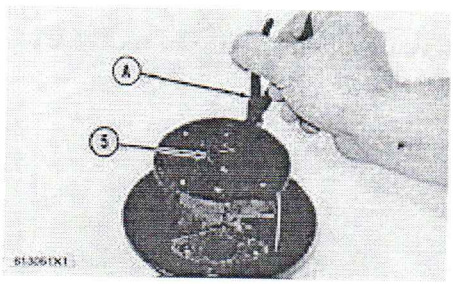
3. Use tool (A) and install snap ring (1) in the turbine end of the cartridge housing.

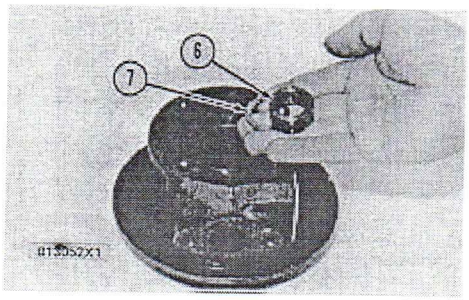
4. Install washer (2) and bearing (3). Use tool (A) to install snap ring (4) to hold the washer and bearing in position.

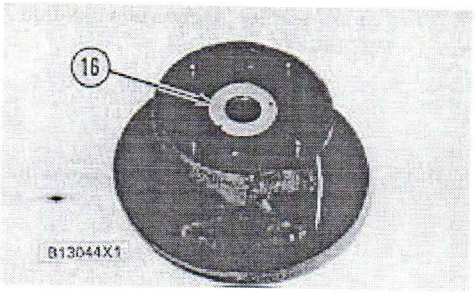
5. Use tool (A) and install snap ring (5) in the cartridge housing.

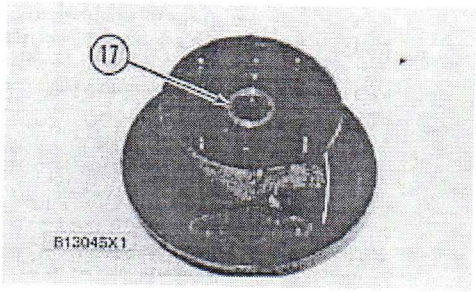
6. Install washer (7) and bearing (6) in the cartridge housing until washer (7) makes contact with snap ring (5).

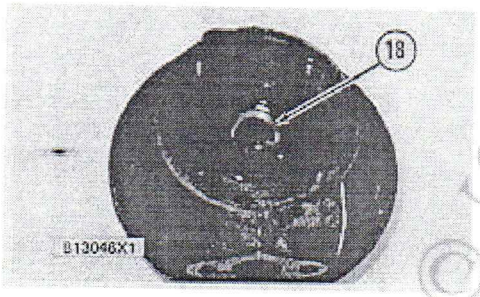


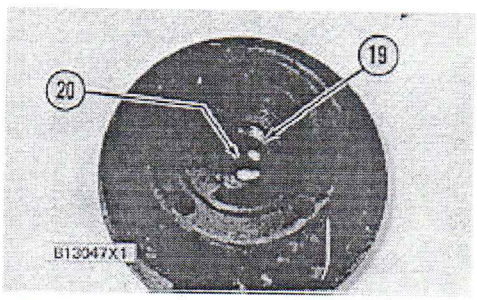




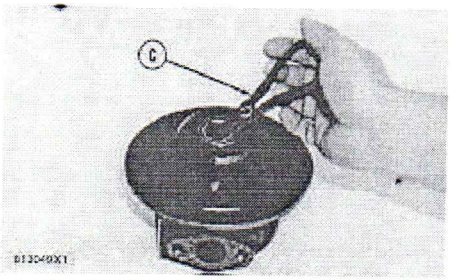




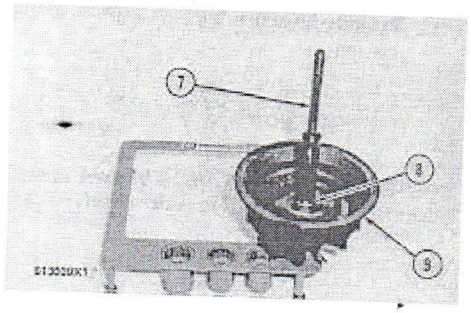


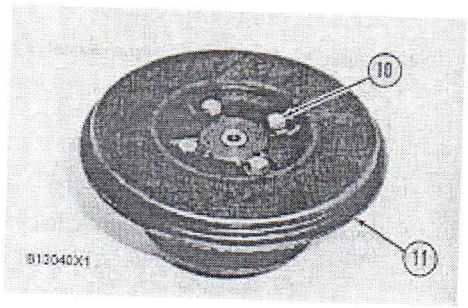


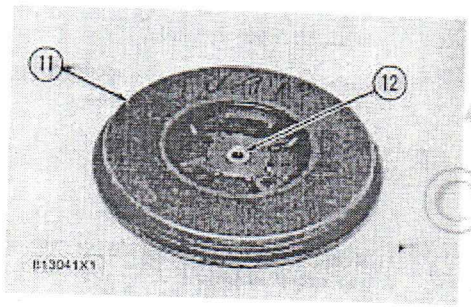
18. If necessary, use tool (C) and compress the end snap ring and push it out of the bearing bore toward the compressor end of the cartridge housing to remove it.

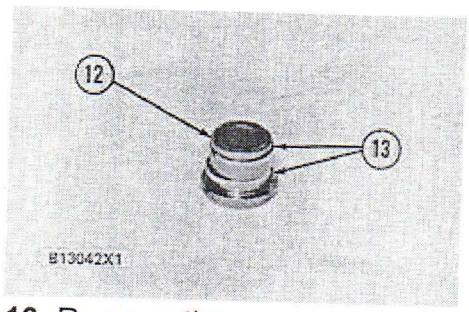


ASSEMBLE TURBOCHARGERS (AIRESEARCH TV91)









13. Remove thrust bearing (16) from the cartridge housing.

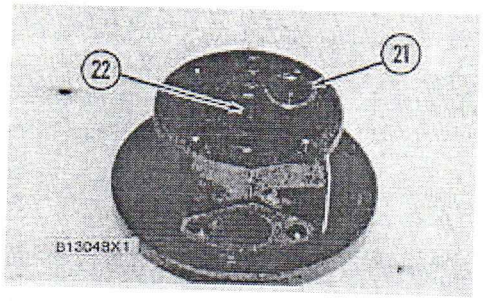
NOTE: If the bearings are to be used again, put identification on them as to their location for correct assembly.

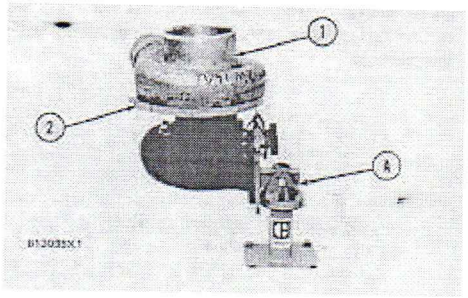
14. Remove bearing (17) from the cartridge housing.

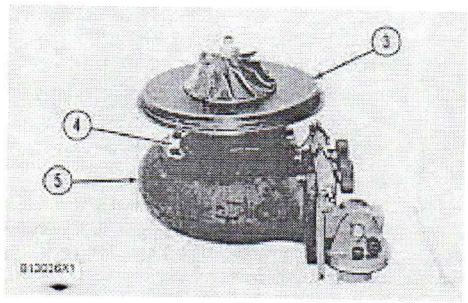
15. Remove washer (18) from the cartridge housing.

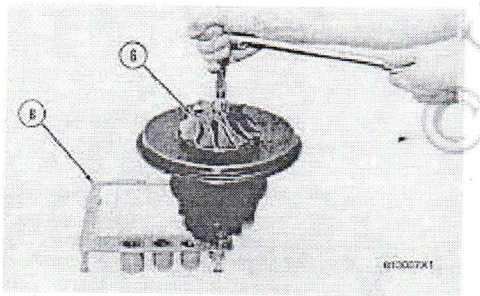
16. Use tool (C) and remove snap rings (19) and (20) from the cartridge housing.

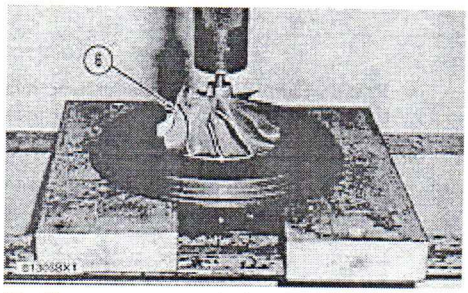
17. Remove bearing (21) and washer (22) from the cartridge housing.











7. Remove seal ring (8) and shroud (9) from turbine shaft (7).

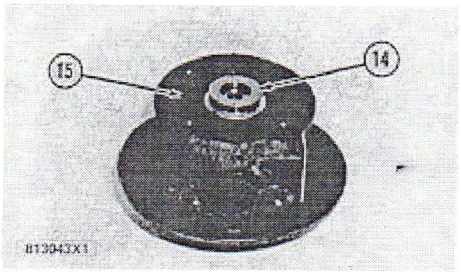
8. Bend the tabs of the locks from bolts (10) and remove the bolts.

9. Remove backplate assembly (11) from the cartridge housing. Make a note of the position of the oil holes in the backplate assembly and cartridge housing for correct alignment at assembly.

10. From the opposite side of the backplate (11) that is shown, push spacer (12) out of its bore.

11. Remove seal rings (13) from spacer (12).

12. Remove thrust collar (14) and seal ring (15) from the cartridge housing.



SMCS - 1052

DISASSEMBLE TURBOCHARGERS (AIRESEARCH TV91)

SENR23550021

	Tools Needed	A	B	C
9S6363	Turbocharger Fixture Group	1		
9S6343	Fixture Assembly		1	
1P1853	Snap Ring Pliers			1

start by:

a) remove turbochargers

1. Put the turbocharger in position on tool group (A) as shown. Put marks on the three housings of the turbocharger for correct installation and alignment at assembly.

2. Loosen clamp (2) and remove compressor housing (1) and the clamp from the cartridge assembly.

3. Bend the tabs on locks (4) from the bolts. Remove the bolts, locks (4) and the clamps that hold cartridge housing (3) in turbine housing (5).

4. Remove cartridge housing (3) from turbine housing (5).

⚠ WARNING

CAUTION

To prevent a bent shaft, do not put a side force on the turbine shaft when the compressor wheel nut is loosened.

5. Put the end of the turbine shaft in tool (B). Use a universal joint and socket of the correct size to remove the nut that holds compressor wheel (6) on the turbine shaft.

6. Use a press and push the turbine shaft out of compressor wheel (6) and the cartridge housing. Remove compressor wheel (6) from the cartridge housing.